

REPORT ON NATIONAL HOUSING

CONTENTS

Chapter I.	Introduction
" II.	Nature of the problem.
III.	Housing in rural areas.
IV.	Urban housing.
V.	Agency.
VI.	Improvement and slum clearance.
VII.	Development.
VIII.	Standards.
IX.	Finance.
X.	Middle class housing.
XI.	Legislation.
XII.	Material, Labour and other aspects.
XIII.	Summary of conclusions.
XIV.	Appendices.

## CHAPTER 1

The National Planning Committee appointed the Sub-Committee consisting of the following members to report on National Housing.

1. Sjt. S.D. Prabhavalkar, L.C.E., M.I.E., President.
2. Sjt. V.C. Mehta, B.A., B.E., B.Sc., Chief Engineer, Nagpur Improvement Trust, Nagpur.
3. Sjt. K.T. Divecha, B.E., A.I.A.A. (London), Architect, Bombay.
4. Sjt. G.N. Bhuta, A.R.I.B.A., Architect, Bombay.
5. Sjt. Walchand Hirachand.
6. Dr. L.H. Pandya, Sc.D. (Engineering), A.M.I.E., A.M.Soc.C.E., A.M.I. Struct.E., A.I.Inst.W., Principal, Bengal Engineering College.
7. Sjt. Sris Chandra Chatterjee, Sthapatya Visharad, Architect, Calcutta.
8. Dr. B.N. Dey, D.Sc. (Glasgow), Chief Engineer, Calcutta Corporation.
9. Sjt. Divan Khenchand, Lahore (Model Town).
10. Sjt. R.S. Deshpande, B.E., A.M.I.E., Vastu-Vachaspati, Poona.
11. Smt. Jay Shri Rajji, B.A.
12. Diwan Bahadur V.G. Shete, L.C.E., M.I.E., Hon. Secretary.
13. Sjt. S.B. Joshi, Joint Hon. Secretary.
14. Prof. K.T. Shaw, (Ex-Officio Member).

The following delegates represented their respective Sub-Committees and helped this Sub-Committee for the purpose of Co-ordination on common questions of policy.

1. Smt. Kapilaben Khandwalla of the Labour Sub-Committee.
2. Smt. Kiren Bose of the Sub-Committee on Women's Role in National Planning.

The terms of reference of this Sub-Committee are:-

(a) The provision of materials - Brick, stone, cement, lime, wood, steel, glass etc., needed for house-building of all kinds, and specialised labour needed.

(b) Prescribing of standards of housing accommodation for rural and urban areas, with due regard to climate, situation, kind of need to be met, with suitable provision of air, light, water, sanitary equipment and labour saving devices.

(c) Consideration of the problem of Town-Planning, and the ways and means of relieving congestion of population, with the consequent adequate provision of transport, communications and recreational facilities.

(d) Agency, national, provincial, local or private, to provide housing.

(e) Any other question connected therewith.

The questionnaire of the Sub-Committee is annexed as Appendix I. It was issued to about one hundred individuals and institutions. About fifty replies were received. We express our gratitude to those who so kindly responded to our questionnaire. Their replies have been very useful in the preparation of this report.

The Sub-Committee held five meetings. It was not possible within the short time allotted to this Sub-Committee to collect statistics and data from all over India. The task of collecting such data and chalking out schemes for the various industrial and other urban centres of the different provinces and States of India as well as for the rural population living under different

and other urban centres of the different provinces and States of India as well as for the rural population living under different geographical climatic and demographic conditions is colossal. The Central and the Provincial Housing authorities suggested in the body of this report will take up the work of detailed surveys that are necessary for preparation of the various schemes. This report is of a very general nature and will have to be modified in some respects in the light of information received as a result of such detailed surveys.

We are thankful to the General Secretary of the National Planning Committee, Prof. K.T. Shaw and the Joint-Secretaries for their assistance throughout our work. We are also thankful to the delegates of the Sub-Committees for having placed before us the views of their respective Sub-Committees..

## Chapter II NATURE OF THE PROBLEM

There is abundant evidence in ancient Indian literature, in the remains of old structures and in the archaeological excavations to show that the art and the technique of house building and of planning villages and cities had developed to a high degree in this country. Naturally the houses, villages and towns in the past bore the impress of the religious, cultural, political and sociological conditions then prevailing. Unfortunately, at a certain stage in the history of India, sciences and arts including those of Housing and Town-Planning came to a standstill; things began to deteriorate and today the housing conditions in our villages and towns are very unsatisfactory.

In rural India although air and light are freely available people do not take sufficient advantage of free air and light. They live in dark congested areas and overcrowded houses. Such conditions are attributable to ignorance, poverty, sense of insecurity and age-old habits. There has been no serious attempt for proper water supply to villages. Villagers have neither the guidance nor the means for proper drainage and disposal of refuse, and for want of this they have to remain content with living in insanitary and almost primitive conditions and ~~thus~~ lose the advantage that may be obtained from use of refuse and night soil as manure.

The conditions in the cities and industrial towns are worse. This is the result - first of the lack of interest shown by the State and the industrialists in the proper housing of labour and secondly of the establishment of industries without any plan. Industries naturally attracted large number of labourers who, for want of proper housing, were obliged to live in chawls, mostly single room tenements, which are insanitary, badly-built and very much over-crowded. The density of population in some of our industrial centres has increased to the extent of 700 and odd souls per acre. Successive official reports and publications like the report of the Rent Enquiry Committee appointed by the Government of Bombay - testify to the horrible housing conditions in the industrial centres. It is not surprising that the infant mortality should be of the order of 78% in such dirty human stables. Air and light - the two vitalising forces instead of being easily available to one and all have become marketable commodities.

It is therefore imperative to improve the housing conditions in India immediately. The question of National Housing requires to be tackled on an All India basis. It will save repetition and overlapping and will secure advantages of co-ordinated effort. It will further assure equitable standard of living to the workers in all the provinces and States of India.

Housing means the provision of comfortable shelter and such surroundings and services as would keep the worker fit and cheerful for all the days of the year. In addition to the provision of pleasant and comfortable shelters, it includes the creation of new building sites in well laid-out areas as well as the improvement of existing localities. This means the inclusion of proper arrangement for water supply, drainage, roads, lighting, means of communication and civic centres required for medical relief, education, sport, recreation, administration, shopping and the like.

### Chapter III

#### HOUSING IN RURAL AREAS

Ninety per cent of the population of this country lives in the seven hundred thousand villages. The present unsatisfactory condition of rural housing is a direct consequence of the unsatisfactory condition of Agricultural and cottage industries. Improvement of Rural Housing is only a phase of the great Rural reconstruction effort that will presumably be undertaken by the State. The problem of housing in rural areas is so much inter-connected with the improvement of Agriculture and the cottage industries that it will have to be tackled by an agency which will work in cooperation with that established for the improvement of Agriculture and cottage industries. If the housing problem is postponed or is given a secondary place it will create conditions which it will be difficult to improve at a later stage.

As a first step towards Rural Reconstruction extensive surveys and collection of data will have to be undertaken. Rural Housing must be developed from whole to the part. The central authority will lay down general principles and standards. It will generally be necessary to treat a group of villages as one unit - each unit having its own marketing or distributing or such focal centre. Obviously every village cannot be self-sufficient. Some amenities will be common to the whole group of villages; while some amenities will have to be provided separately for each village.

Following is an illustrative list of amenities which will be treated on a regional basis, i.e. for a group of a number of villages:-

- (1) Marketing and distributing centres.
- (2) Main communications with cross drainage works.
- (3) Water supply schemes if the group of villages is favourably situated with respect to the central source.
- (4) Irrigation.
- (5) High Schools.
- (6) Jails.
- (7) Dispensary and Hospital.
- (8) Ambulance.
- (9) Library.
- (10) Post Office - one central and few sub-offices.
- (11) Museum.
- (12) Electric supply, if possible.
- (13) Cinema.
- (14) Experimental farm.
- (15) Tannery.
- (16) Weaving shed.
- (17) Military Training Centre.
- (18) Police Chowkie.
- (19) Dharam Shala.
- (20) Co-operative Institutes including a bank.
- (21) Bus stand.
- (22) Radio place.

This is only by way of indication. Slight variations may be necessary to meet individual requirements.

Following is also an illustrative list of amenities that will have to be provided separately for each village:-

- (1) Approach Road.
- (2) Field Tracks.
- (3) Village streets and squares.
- (4) Village wells, baths and wash houses.
- (5) Cattle troughs and ponds.
- (6) Public sanitary

arrangements. (7) Meeting Hall. (8) Play ground. (9) Religious places. (10) Primary school. (11) Cemeteries. (12) Work house. (13) Gymnasia. (14) Village Common. (15) Cattle Stand.

It will be necessary that both regional as well as local amenities are worked out on a planned basis. Master plans for the large as well as the small units should be prepared and the work regarding remodelling and future extensions as well as for these amenities should be carried out as per plan. The house plan and the domestic amenities to be provided therein will depend upon the class of persons for whom it is intended. These may be any of the following: cultivator, labourer, carpenter, black-smith, potter, tailor, shoe-maker, oil-miller, carder, weaver, brass-smith, grain-merchant, grocer, broker, gold-smith, shepherd, village ~~xxxxxxxx~~ priest or Mulla, shopkeeper, barber, washerman, tanner, mechanic, apothecary and village/ servants. With the revival of cottage industries - there will be a few more classes of workers.

An illustrative list of requirements for a Rural House may be given as under, to be oriented in accordance with the sanctioned master plans.

(1) Verandah or Verandahs. (2) One or two rooms. (3) Kitchen (4) Store (5) Grain bin (6) Fodder store (7) Cattle shed (8) Implements store (9) Fuel shed (10) Bathing platform or enclosure (11) Sanitary arrangements (12) Court yard (13) Manure pit (14) Main enclosure.

A list of fitments will be as follows -- (1) Shelves (2) Pots (3) Roof-Pendants (4) Cup-board (5) Fire place, where necessary (6) Kit platform (7) Loft (8) Treasure chest (9) Niches (10) Drying lines (11) Grinding place (12) Pounding block (13) Churning fitment (14) Fodder trough.

The question arises as regards the agency by which the execution of the different branches of Rural Housing is to take place. General amenities pertaining to a group of villages and those amenities in one particular village which are common to all the inhabitants without distinction of caste or creed should be provided by the State, i.e. by one or all the authorities established by the Central or Provincial Governments for specified purposes. For example, schemes such as communications and cross-drainage works will be undertaken by the Provincial Governments - while the construction of approach roads, field tracks, gymnasia, etc., can be executed by the local authority such as a Panchayat by raising its own funds for the purpose or better still by cooperative labour.

As regards the village house itself it is advisable that a village family should own its own house. This is in view of the fact that the population in a village is expected to be more or less immobile. Secondly, a house cannot be well maintained unless the occupant has some adequate interest in it. Proper maintenance will be of the essence of Rural Housing. The kind of construction that is visualized for the Rural Houses is such as would last for several years only if it is properly maintained from day to day.

Regarding actual construction of houses, mutual cooperation will have to be the basis of any programme. The type of construction should be easy enough as can be

undertaken by villagers themselves. The materials of construction should, as far as possible, be those which are locally available. Any other type of material which is not available in the locality should be supplied by the State at cost price. It is only on these lines that the problem of Rural Housing can be solved. Unlike the industrial labour, a village inhabitant has to remain idle for some part of the year, and can spend his time usefully in building his own house.

Difficulty will arise with regard to land required for building the house. Many of the villagers are mere tenants and the houses they live in are situated on the land belonging to the landlord. Some means will have to be found to increase the interest of the villager in a house built on another's land - either by making the house-site available to him or by assigning him an almost permanent term of tenancy which will make it possible for him to build a house of the proper type and maintain it in a fit condition.

As the people living in villages are expected to spend most of their time out of doors, unlike the labourers residing in urban industrial areas, such high standards of light and ventilation as are necessary for the latter, need not be rigidly insisted upon for the rural areas. The houses, however, should be built after type plans or models with accepted modifications where necessary and according to instructions given therewith. Rules framed for the purpose will have to take into account all the items, some examples of which are given below: Even though all the windows be closed by night either through ignorance or for fear of draught or insecurity, sufficient air should get into the living rooms through roof ventilators, clerestory windows or honey-combed portions of walls. It should be insisted that no cattle - even young calves are allowed to occupy any space inside the house and further that the waste water from the bath room and slop water from the kitchen, drains at least some distance away from the house, before it soaks into the ground exposed to sun.

Any attempt at improving the housing conditions in the villages is doomed to failure, if it is not accompanied by education of villagers. There shall be constant propaganda in the form of pictures with the aid of lantern slides and the like. These will emphasise on the following aspects: (1) Good house with clean and cheerful surroundings; (2) Demonstrations as to how to construct such a house; (3) Methods and advantages of hygienic living, and (4) Advantages of cooperative work.

This can be effectively done, if the main calamity of the village, viz., the migration of the intellectuals, is stopped or the village is re-imbursed with its moral and intellectual wealth.

#### Chapter IV.

##### URBAN HOUSING

Urban Housing includes working class housing, middle class housing and upper class housing. Both the middle class and labour class housing require State attention.

Housing problem in urban areas essentially differs from that in rural districts. Population in the latter is more or less immobile whereas that in the former is of a floating character. Cost of urban land is very high. Though

the manufactured building materials and skill & labour are costly in the villages, those of local nature are cheap. Villagers have to remain idle for some months in the year and can, therefore, contribute their labour in the rural housing schemes. On the other hand, town worker has to repeat the same mechanical operations from day to day and from morning to eve and that too indoors. He cannot be expected to give any labour contribution for his housing, because his spare time must be devoted to recuperation of the exhausted energy and strained nerves. There are avenues of cost reduction in urban housing by mass production and the like whereas such chances are few, if any, in rural housing on account of its scattered nature. Stabling of livestock, storage of field-produce and the like dictate a treatment which stands in marked contrast with that for industrial workers whose life - functions are amenable to distributive and concentrated treatment. These factors have to be taken into account in tackling the problem of national housing.

One can get an idea of the unsatisfactory conditions of urban housing from the following:-

(1) Absence of zoning (2) Lack of planning (3) Inadequate control (4) Insanitary areas (5) Want of amenities (6) Congestion

(b) House:-

(1) Squatter type of huts (2) Insanitary houses (3) Sub-standard tenements (4) Sub-Division of tenements (5) Over-crowding (6) Shortage.

There is an urgent need of immediate and extensive improvements. The difficulties, however, are not easy to overcome. Suffice here to mention a few of them: (1) Vested interests (2) Scarcity of building sites or township space (3) Want of proper and cheap transport (4) Ill-distribution of houses (5) Obsolescence (6) Low rent-paying capacity (7) Floating nature of labour (8) Insecurity of employment (9) Family and non-family units (10) Numerical sex disparity (11) Illiteracy (12) Prejudices and customs (13) Property-sense (14) Profiteering (15) High cost of site and house (16) Sociological complications (17) Peculiar trend of selectivity (18) Communalism (19) Provincialism (20) Want of civic sense (21) Tightness of public finance. Not all these difficulties come under the purview of this sub-committee. The main difficulty is poverty and the second is the prejudices and ignorance of the people. It is hoped that the second difficulty will disappear in course of time.

There are two aspects of urban housing. First improvement of inhabited areas and secondly development of new areas. These are treated in the relevant subsequent chapters.

## Chapter V

### AGENCY

Before the details of the means to be adopted for clearing the slums and planning for expansion are considered the fundamental question of policy - whether provision of housing for the labour class should be left to private profit-seeking enterprise or to State must be settled.

The economic conditions of the workers will not permit them to pay a rent for their housing, which would give adequate return to the private individuals, who may be interested in

providing such housing. It is not possible to attract private individuals or joint-stock corporations to undertake any housing scheme, which will not give them proper return on their outlay. The standard of accommodation at present prevailing in the big industrial cities is very low and requires to be considerably brought up. When that is done there will hardly be more than two or three per cent net return on the investment which is not likely to attract private enterprise. If the State does not undertake the housing for the labourers, the private individuals and corporations will not keep up the standard which appears to be the minimum, in our opinion, for labour class housing.

A comparison between the industrial housing problem of India and that of the most of the Western countries will be informative and interesting. Former starts with more or less a clean slate while the latter woke up after the industries had already been indiscriminately established. The programme of housing the labour population of the existing industries is very small when compared with that of the industries that India has yet to establish. Again, many of the new industries such as the defence and key industries are going to be state-owned. The financial implications, therefore, are less complex and there will be no difficulty in raising the necessary capital as has been already found in the case of railways. We have, therefore, come to the conclusion after due deliberation that the housing for the labouring class should be undertaken by the State.

There may be some parts in India where it is possible for a private individual to provide the working class housing within the rental capacity of that class. Any private individual is free to provide such housing subject to the control of the State but it is unwise to depend upon private enterprise for providing all the requirements of working class housing in all the industrial centres and neglect proper arrangements for it in a National Plan, especially in view of the fact that working class housing by private enterprise has proved unsatisfactory in some of our important industrial towns.

It is suggested in some quarters that employers themselves may be required to provide for housing their workmen. The suggestion is not favoured by the representatives of labour. They fear that this would lead to restrictions of their civil liberties by direct and indirect means. Industry also will not take the suggestion favourably as it would involve extra capital.

Having decided upon state agency for the provision of labour class housing in industrial towns, the question arises as to how this agency should be established. The general term State includes 'Central Government', Provincial Government, Municipalities, Local Boards, and any other local authorities established by statute.

Over and above the execution of labour-class housing, improvements and expansions so as to provide proper surroundings to all the classes will require comprehensive planning. For the sake of co-ordination of policy, avoidance of over-lapping and clash of work, it is proposed to string all the fountain-heads of powers and repositories of responsibilities. It is suggested to create special statutory authorities for the purpose, viz., (1) Central Housing and Planning Board; (2) Provincial Housing and Planning Boards.

The Central Board will lay down general principles, decide comprehensive fundamentals of policy, programme, finance and technique, as well as fix general standards. It will work as a guide and a help. It will serve as a clearing house of fundamental information. It will also prepare and get passed such acts as are necessary for the delegation of powers to the various authorities. The Provincial Board will guide and



control all schemes, but will not be concerned with all the details of the various acts to be passed by the Provincial Legislature and frame rules and regulations for the approval of the Provincial Government. The local authorities will be either of regional or municipal character. It will have to do the work of initiative as well as that of carrying out the executive work. This body will be clothed with full powers under the general control of the Provincial Body. Such local authority will be either District Council or Municipality or a Special Statutory Body or a Statutory Sub-Committee created for the purpose according to the merits of each case.

#### WOMEN'S ROLE IN HOUSING

Nowhere in National Planning the woman's role will be more effective and more useful than in housing. Home belongs to the house-wife. Conversion of house into home as required in National Housing cannot be done better than under the inspiring guidance of the woman who has first hand knowledge of what constitutes home. All the petty yet almost indispensable devices that go to make house-keeping fatiguing, less costly and more homely can be properly conceived by the woman.

Her role in civic life will be equally useful as in home life. Her activities round welfare centres, maternity homes, creches, schools, cottage industries and the like will be the real inspiring and moulding force to all the beneficent working of such institutions. For reasons like these we recommend that arrangements should be made so as to give an effective voice to the woman in the actual execution of the housing and planning schemes.

Chapter VIIMPROVEMENT & SLUM CLEARANCE

The report of the Bombay Rent Enquiry Committee gives the average density in Bombay as 75 persons per acre - the maximum being 727 and the minimum 101 per acre. Though the area in the North of the Island of Bombay is recently developed and people have migrated to this area, the density in thickly populated parts has not appreciably fallen. In Bombay about 72% of the population live in one room and about 14% in two room tenements. Approximately 20% of the population live in overcrowded single rooms each occupied by 6 or 9 persons and about 7½% of the population lives in single rooms occupied by 10 or 19 persons. Most of these one or two rooms tenements are insanitary, dark and badly ventilated. This is not peculiar to Bombay only. It applies to all industrial towns more or less equally. The efforts made so far both by private individuals and the authorities have not achieved the desirable effect as regards the standard, magnitude and the method of approach.

Slums are not restricted to industrial areas only. They are found in all towns and cities where industry has not much developed. They are partly due to ignorance and poverty and may to some extent be due to classification of society into high and low castes or classes, but chiefly due to want of systematic attention.

Slum clearance is a slow process and there is a practical limit beyond which it cannot be accelerated. But slums will never be done away with unless a definite and well-arranged plan is adopted and is continuously carried on.

Any attempt at reduction of density will involve provision of new sites and new houses either in the neighbourhood or far removed.

This problem is full of complications. The working class is naturally inclined to live somewhere near the industry in which it is employed. If they are to be persuaded to live far away from their place of work, adequate provision for cheap and convenient transport will have to be made. It is not generally desirable to house workmen far away from their place of work. But this ideal cannot be reached in case of old established industries in the neighbourhood of which new sites are not available or which cannot be shifted. The other possible remedy is the provision of very tall buildings in such localities. Vertical development is a method employed in other countries with great success to relieve overcrowding. This kind of vertical development introduces its own problems such as pumping for water supply, special fire-lighting appliances, provision of lifts, etc., which tend to increase the rent of the tenements.

This will not, however, reduce the density though it will reduce overcrowding of rooms by reducing shortlets and enable the replacement of sub-standard and insanitary tenements by good ones.

It would, therefore, be a wise policy to shift the industries themselves. This will be to the ultimate benefit of all concerned.

The problem will be tackled by industrial town-ship system in which such industries as could be shifted wholesale will be removed to virgin areas on the outskirts of the city and established with a proper layout and with margin for future expansion. After such removal is effected, there will be room for increased housing accommodation at the old site

making both reduction in density and provision of good housing possible for the removed as well as the remaining industries.

It is obvious that open raw land can be acquired and developed and then given over as building plots at a profit, while reverse will be the case where clearance of built-over portions is involved, though in particular cases even the latter can be made self-supporting by adopting a suitable technique. In any case it is to be noted that sound financing necessitates the balancing of remunerative against unremunerative schemes as far as possible.

Chapter VIIDEVELOPMENT

The improvement of existing conditions or slum clearance will not be possible without development of raw land on a large and comprehensive scale in and around the town. If the principle of not de-housing a single family without making re-housing arrangement is kept up, great deal of obstruction to slum clearance will be taken away. Development of large open areas is, therefore, a necessity for such an expansion. This requires pre-planning. Housing on a large scale cannot and should not be thought of irrespective of town-planning. The relation of the arrangement of plots, blocks and streets, the distribution of parks, playing fields and open spaces, the location of various amenities, and lastly of the fixation of the residential, commercial and industrial areas in such a way as to ensure the health, comfort, safety and convenience of the inhabitants are items which need no emphasis for a development scheme.

For the purpose, long range views have to be taken and the whole area including the built-over portions ought to be town-planned. This will require one or more of the following plans: (1) Regional plan. (2) Master plan. (3) Zoning. (4) Layout plan. (5) Service plan. (6) Transportation plan. (7) Full co-ordinated plan.

The street system must be so planned, that it will answer every-day requirement of traffic, business and access to the houses. The physical well being and health of the community must be ensured by providing sufficient light, open space and air and by utilities which will promote good sanitary conditions. The expenditure should be so proportioned between the various requirements that it will be most effective in bringing xxxxx about the desired result. The plan must make complete and economical provision for all the needs of the city. The endeavour is to provide not merely houses but homes with all the attendant attributes of living and liveable town. Any housing scheme, therefore, will not be a proper success if communitarian life is not encouraged and if necessary, buildings, spaces and sites for recreation, medical relief, domestic needs, protection and the like are not provided. An illustrative list of such requisites is given below:-

- (1) Neighbourhood garden. (2) Children's place.
- (3) Playing field. (4) Ladies club. (5) Gymnasium.
- (6) Military Training ground. (7) Girls and Boys scout grounds. (8) Theatre. (9) Maternity home. (10) Creche.
- (11) Welfare centre. (12) Dispensary. (13) Hospital.
- (14) Nursing home. (15) Veterinary hospital. (16) Bal mandir - Nursery school. (17) Primary School. (18) Secondary school. (19) High School. (20) Girls' School. (21) Cottage Industry centre. (22) Handicrafts' School. (23) Industrial school. (24) Meat, vegetable and fruit market. (25) Night schools. (26) General stores. (27) Shopping bazar. (28) Grass market. (29) Public conveniences. (30) Vehicle stands. (31) Car park. (32) Barbers' Seat. (33) Bus stand. (34) Transport stations. (35) Post office. (36) Telegraph office. (37) Telephone booth. (38) Petrol service station. (39) Meeting maidans. (40) Trade Union centres. (41) Town hall. (42) Library. (43) Electric sub-stations. (44) Fire stations. (45) Booking and Parcel office. (46) Police chowkie.

The provision of amenities like the above and

necessities like roads, sewers, drains, water-pipes, lights etc., can be efficiently and economically provided if the layout is of the right type. It has been noticed that the Swastik type layout is found to be one of the best both for use and cost. It ensures central communitarian space and well situated shopping places, enabling better financial returns.

Whatever the type of layout, it is desirable that plots should not be back to back but should have a back lane carrying all the services like, sewer, waterpipes, electricity, etc. The common mistake in such development of not making proper provision for gaulis (shepherds), domestic servants, commercial labour and the like should be avoided. Reserving appropriate areas for appropriate purposes on a comprehensive basis will be necessary to fix zones of various types as suggested above. Similarly the topography and soil conditions, pleasing vistas, freedom from local nuisances, mosquito swamps, factory smokes etc., climatological and demographic conditions, cost of land, political and other proprietary boundaries, nearness of existing city portions, accessibility to and from the plant on the time-distance and fatigue basis, transportation facilities, proximity to high-ways or water-ways and the like, availability and cost of developing water, sewer, drainage, electricity and such utilities - all these will have to be given due weight.

Owing to indiscriminate expansion and laissez faire method adopted by the authorities both necessities and amenities in most of the town are conspicuous by their absence. Developments have occurred in a totally jungle type and unregulated manner. The most condemned ribbon development is rather a rule than an exception. In most cases, layouts of private lands are not fully co-ordinated with the adjoining areas. Every inch of available land is made saleable as far as possible.

Even under the garb of town planning scheme, financially acceptable in the first instance, some of the essential services such as drainage are left out from the scheme deliberately, leaving the local body to face the problem.

If a policy of not permitting the construction of a single building without first ensuring complete development of the whole area with essential services and amenities, be adopted, the situation described above will not arise. Such a policy will go a great way to improve conditions but the most effective method is to stop private conversion of agricultural land to non-agricultural purpose by proper legislation. The attempts at control by way of betterment charges, success condemnation and subsequent release and the like are only makeshift arrangements.

In any case the first thing to be done for effective planning and housing is to immediately put under control of the planning and housing boards or any delegated authority thereof, the whole of the land within the influence of the town, say a radius of 5 miles.

Whether the land is developed by a private individual or by a statutory body, the fundamental principle, viz., "land to bear its own cost" shall have to be enforced. Briefly, when a cultivated piece of land is given over as a building site, it is a conversion which is possible only if the essential services and amenities are made available to the piece of land; only after this, there is real conversion to building sites. The details are varied and many but these will find their due place in legislation, when undertaken at the instance of the National Planning Commission. It is, however, to be noted that

the responsibility of providing the actual buildings on the sites reserved and prepared for the various civic amenities will have to be separately considered on the merits of each case.

The best laid-out plans - both technically and financially - can be sabotaged if there is no proper control during construction. This will have to be effected in a variety of ways, such as special methods of leasing plots or definite terms of house tenancy, or bye-laws specially enacted or adopted from the standard rules by modifications.

The above are the general points for development. Regarding labour housing, there are some peculiarities which are noteworthy, e.g. such a development will take the form of what may be called Industrial Township. It will perhaps in many cases be the only method of housing the industrial workers. The degree of benefit will rise considerably with the increasing obsolescence. There is a possibility of making the township self-sufficient and also self-supporting. Welfare activities will have better field. The work, play and plant control from the National outlook will be effective and efficient, e.g. what are known as allotment gardens will be practicable in such a township.

It must be noted that in country-wide housing of the future, 'development' will come into prominence as this will form one of the main or perhaps the only basis of all improvements in the living conditions of the poor.

STANDARD

The standards will generally vary from province to province, if not from district to district. The variations are partly due to difference in the economic conditions but mainly due to the climatic environments, sociological circumstances, building traditions, topographical features and occupier's profession. Therefore, all the minimum standards, rigidly specified, will not be valid for all places. The broad conception, however, of minimum standards deserves to be recorded.

They should be based on consideration of sanitation, comfort, convenience, safety, and social and national objective, such as promotion of efficiency in labour and of human values. Some of these may have to be modified due to economic considerations.

SITE

A healthy, adequately sloping elevated site in the proximity of parent industry with sufficient extent for future expansion is desired. It should preferably be such as could be cheaply developed.

STREETS

The minimum width of the main road should be 60 ft. and that of internal road 30 ft. The construction should be strong and durable, provided with proper storm water drainage. The surface should be dust-proof wherever possible or necessary. The percentage of land under roads and lanes should be about 20% of the whole or about 36% of the building sites.

AMENITIES:

Sites for all the civic requirements such as those of medical relief, education, recreation, administration, shopping and the like should be provided to an extent of 25% of the whole or nearly 1/2 of the area of residential sites which will be about 5% of the whole xxxxxxxxx.

SERVICE LANES:

The plots should not be back to back but will have a back service lane of at least 15 ft. width. It shall carry as many services as possible, such as water supply, sewage, storm-drainage, electricity and the like.

SERVICES:

There should be ample provision of potable water, on a minimum basis of 40 gallons per capita for all purposes including municipal and domestic use. The sewerage system should be separate from storm-water and shall be underground and water closets should be served by water carriage system. The methods of disposing of the sewage will vary from place to place. There shall be adequate provision for lighting of streets and good and cheap transportation services, such as bus, street, car or railway.

HOUSE:

The built up area shall not exceed 1/4 to 1/3 of the plot area: The marginal spaces thereof shall not be less than 15 ft.

The floor area including that of verandah will be at least 60 s. ft. per adult. The aim of the National Planning Committee is 100 s. ft. Though this is desirable, it has been found that under the present economic circumstances, 60 sq. ft. can only be fixed as the minimum.

The minimum height shall be 9 ft. clear. The rooms shall have at least an external wall abutting an open space; openings for light and ventilation shall be 1/7 of the floor area, excluding door area. There should be through ventilation. Each family shall have one bath and one latrine on the water carriage system, with proper ventilation and adequate equipment.

Stair cases and passages and corridors to be of a minimum width of 3 ft. and 4 ft. respectively, of fire-proof construction with proper light and ventilation. Lift shall be provided for a building more than 40 ft. high and having more than three stories.

Every unit shall have at least two separate exits and there should be convenient ingress and egress.

Though detached houses may be preferable, semi-detached ones will in some cases be practical. In most of the cases, however, row type structures will be necessary; this shall have not more than 20 tenements distributed over two floors at the maximum. Multiple storeroom buildings will be adopted only where land cost is very high or there is absolute absence of suitable land.

The accommodation for a family should preferably be as under:

Main room	....	15'	x	10'	=	150 sq. ft.
Kitchen	....	8'	x	6'	=	48 sq. ft.
Verandah	....	9'	x	6½'	=	58½ sq. ft.
Bath Room	....	7'	x	3½'	=	24½ sq. ft.
W.C.	....	4'	x	3'	=	12 sq. ft.

#### MATERIALS

External walls and roofs should give protection from weather in all seasons of the year.

Floor should be as impervious as possible but such as would not induce cold and the like. Un glazed tiles, properly maintained mud floor, lime concrete and the like are suggested for the floor but a detailed study to find out a suitable paving material is necessary. Attempts have to be made to get a roof of low thermal conductivity in addition to its being rain-proof.

#### FIXTURES AND FITMENTS:

The question presents more varied problems than that of the house according to the mode of living of the occupant, climate and the like. Indian workers like to have built in fixtures and fitments, unlike their comrades in foreign countries. The question, therefore, becomes more important as these should be inserted in the building beforehand. A typical list for normal requirements is given below:

- (1) Washing basins. (2) Cleaning platform. (3) Fire place with cooking platform. (4) Loft. (5) Provision racks. (6) Fuel bin. (7) Drying bars. (8) Shelves. (9) Fogs. (10) Roof pendants. (11) Nirkazy Cup-boards. (12) Kit platform. (13) Water place. (14) Niches. (15) Swing rings. (16) Shoe recess. (17) Curtain hangers. (17) Grinding stone.

Care shall have to be given to the sanitary requirements such as washing and cleaning arrangements, removal of domestic refuse, cooking arrangement, proper plumbing, hygienic storage, vermin prevention, fire protection, proper upkeep and the like.

Density of population should not be more than 100 persons per gross acre. This will mean 20 to 25 tenements per acre. In new developments in America, the standard varies between 6 to 10 per acre, becoming 12 or more per acre in row houses.



The maximum in English practice is 12 houses per acre, while P.E.F. recommends that 16 per acre should be allowable. But there are cases of 25 to 30 houses per acre in the new developments in England. From these points of view, the proposed density may appear high, but the actuals, when tested, show that this density may be allowable.

The difference is, perhaps, due to the fact that the major part of living in other countries is indoors while the same in India is out of doors. The built-up portion, therefore, in the latter country is much less per family, with the result that in spite of the higher density, the actual open space will be as large as if not larger than that in other countries. The effect of density will largely depend upon the road, road or indifferent design of the town plan. If the open spaces are properly distributed and other civic amenities properly located, the question of density will be more or less secondary.

Some examples of standards (appendix 2) relevant in some of the foreign countries as collected by Mr. V.C. Mehta, during the preparation of this report, will give an insight into the question of how similar problems are tackled in different climates. It appears that they have a different basis altogether. The main difference being due to the difference in climatic and sociological conditions and consequent difference in the mode of living and habits of life. It should be borne in mind that if standards are very idealistic and of high order, they will never be followed as the cost will be so high that it will get out of practicability. Not only the wage earners will certainly be unable to afford such costly housing, but even the nation as a whole may find it difficult to ~~xxx~~ provide such housing. On the other hand, if the standards be determined by the rental capacity of the labour class, they will be so low, as to fall far below the accepted minimum for safety, space, light, ventilation and sanitation.

It will be easily seen that though the foregoing standards are applicable to most of the areas, the main background is that of labour housing in industrial centres. The question of standards, however, regarding other classes of housing, in rural as well as urban areas, is touched in the respective chapters.

CHAPTER IXFINANCE

Housing can be divided into the following sections:

- (1) Houses for the wealthy class of people;
- (2) " " " middle class;
- (3) " " " working class.

Housing for (1) and (2) may be left to private enterprise because they are able to pay a rent which would give a reasonable return on the investment. The real problem is with regard to (3). For this class it will be seen from what follows that the return may be as low as 1.6% at the economic rent of 10% of income. Hence it is absolutely necessary that the housing of the labouring class should be a state concern as already discussed.

FINANCIAL FORECAST:

The population of the whole of India is about 400 millions. About 90% of this population lives in the villages, leaving 10% or about 40 millions, in cities. It is found that about 86% of the urban population, i.e., about 34.4 millions live in one or two-room tenements.

There is every likelihood that in course of time the industrial labour population to be housed will rise from the present estimated urban figure of 34.4 to 40 millions due to industrialisation, better housing and the like. Normal strength of an urban labour family varies from 5 to 4; but from the sociological trends, one may expect that the number of houses required ultimately may be based on a strength of four. The total number of labor houses thus works out to 10 millions as the Nation's future requirement. Most of these will be new. The existing ones are either badly situated or are bad themselves. Taking half of one-room tenements as worth demolition and the rest convertible to the adopted standard by halving their number, the available number becomes one-fourth of the present. Regarding two-room tenements, it is supposed that the same can be remodelled so as to come up to the standard. Taking 7 million tenements for the present labor population of 34.4 million souls, and the proportion of one and two-room tenements as 6 to 1, the number of units available after conversion becomes 1 million remodelled two-room tenements and one-fourth of six, i.e.,  $1\frac{1}{2}$  million converted single-room tenements, making up a total of 2.5 million standard units to be newly constructed. Taking an average figure of ~~Rs. 1250~~ as cost per unit of old as well as new, and assuming that only 25% of the total requirement of 10 million units will be constructed in the first ten years of the National programme, the finance required will be Rs. 3,125 millions. The annual return on this amount will vary according to assumptions of family income and of the percentage of the same available for rent. The former varies from Rs. 40 to Rs. 60 per month while the latter from 15 to 10. The ideal is to charge not more than 10% of the family income for the house-rent. If it is assumed that the increase in the family income and the reduction in the percentage of income spent tend to balance, the monthly rent per unit may be taken as Rs. 6. The outgoings such as insurance, depreciation, repairs, defaults, administration, vacancies rates and taxes and the like amount to Rs. 31.74 per annum and a net return of about 3% is left. The assumptions are not likely to be upset as there is every likelihood of large scale working and organised programme under National Planned economy by which supply of land, material and

labor can be made available from a national standpoint and thus made to contribute to some saving in over-all costs. If, however, the contributory cause becomes ineffective, the calculated return of 3% may go down to about 2.5% or less according to the increase in capital cost. Similarly if the income remains static and rent is reduced to 10% from 15% of the income, the return in interest may fall down to 1.6%. It is, however, believed that the normal figures given above will in all probability be obtained.

The following financial arrangements are available for the housing to be undertaken by the State:

- (1) Loans.
- (2) Taxation.
- (3) Profits from land.
- (4) Profits from utility services.
- (5) Profits from building industries.
- (6) Endowments and grants.

**(1) LOANS:** This is the only method by which the problem of National housing can be effectively tackled. The loans will have to be floated by the Government on their behalf for the National Housing. Of course, it has to be visualised that under the general awakening, almost all bodies, viz., the Central Government, Provincial Governments, Local Bodies, Societies, institutions and companies will be out in the market for capital. Under National Planning, there will be a large number of industries either on national or non-national scale. Government will be out in the money market for financing their social and other welfare and uplift schemes, such as Prohibition, Primary Education, Rural Communication, Village Water Supply, Public Health and the like. The finances of the local bodies are bound to be stressed to a very great extent for their drainage and water supply schemes which will necessitate loans for which, in a majority of cases, the Provincial Governments concerned will be approached. The stress on the money market will, therefore, be very great with the progress of time. It will be very difficult for the loan to be subscribed in full for a scheme of low return unless the same is supplemented by some sort of taxation.

**(2) TAXATION:** This method of financing labour housing will be indirectly a sort of grant as the power of taxing mainly rests with the Government. There are three different taxing authorities, viz., Central Government, Provincial Governments and the local bodies. Though it is possible under this system for the Central or Federal and Provincial Governments and Local Bodies to have independent sources of revenue, circumstances have led in most countries to the development of a mixed system of taxation. Under such a system, while some items of taxation belong entirely to one or other authorities, revenue may be derived for them from certain common sources. This inter-dependent taxation system may result in contributions, surtaxes, cesses, assignments, subventions, grants-in-aid and the like. Whoever the taxing authority and whichever the form the taxation may take, the ultimate source of public revenue is the income of the people and it is immaterial to the tax-payer who out of the three authorities collect the tax. It is, however, necessary to give some indication of the possibilities.

As said in the foregoing chapter, the Housing and Planning board for the whole of India is the vital structure on which National Housing is made to depend. The taxes that will generally be available to any local authority under the said Board will be of various types. But it is proper that the tax should fall on those who are chiefly concerned with the

benefits accruing from properly housing the labour class. When a scheme is mooted to have about 10 million houses or tenements under the National Housing scheme, the building industry and the building material trade will be benefitted to a very large extent. Similarly, the industries or concerns employing the labour classes which are proposed to be housed will have contented and happy and therefore more efficient workers with mutual advantage. The output of these beneficiaries will be the natural items of taxation. It is neither necessary nor advisable to fix any definite amount of taxation at this stage of planning. Some indication, however, is given of this taxation in Appendix - 3a.

This taxation of 1% ad valorem on the whole out-turn of all concerns employing labour would bring in about 40 millions of rupees per year which will increase the return on 2.5 millions of tenements proposed to be built from 1.6% to 2.3% as per Appendix - 3b. In this way, it is feasible to put up the required buildings for the labouring class with very little loss. This loss in the return can be made up by the new industries in connection with the building trade which is bound to rise. For the estimate of 40 millions of rupees due to 1% excise is based on the output of the existing industries only. With additional output of the new industries the return will be little over 3%. This method of financing housing by taxation will help the new industries in so far as they would be saved from ~~xxxxxxx~~ ~~xxxxxxxx~~ locking up a good deal of their capital in the very early stages of their working as no new industry can be thought of without adequate provision of labor housing.

(3) PROFITS FROM LAND: This is also another source. When any Housing Colony is taken up on a virgin soil, the value of the land will automatically rise. The profits from this positional value of land will amount to a considerable sum which, as has been mentioned before, will go a long way towards slum clearance schemes

The financial arrangement expected of local authorities will be considerable because of the fact that the activities of the National Housing will primarily be a great and general relief to the local bodies concerned. The local bodies will be greatly benefitted by the increased income or revenue from rates and taxes on new houses, whereas the cost of essential services due to the removal of slums and creation of well-built townships. For these reasons it will be necessary and legitimate for the local bodies to shoulder some responsibility for the completion of these housing schemes.

(4) and (5). PROFITS FROM VARIOUS UNDERTAKINGS: There is a possibility of some industries of building materials being nationalised. The details of such nationalisation will be available either in the form of rebates or in the form of assignments. To depend upon such profits is legitimate because these industries will reap much benefit out of the activities of National Housing. Same is the case with regard to public utilities. It will be premature to give a concrete figure of such sources but it can safely be assumed to be considerable with proper management and organisation.

(6) ENDOWMENTS AND GRANTS: This method of financing is very meagre in quantity. It is, however, very important from the point of view of quality. It is possible that the endowments, if any, will help towards some housing amenities such as schools, gymnasias, parks and the like.

There is another source, though small, like Endowment Fund which is a charity fund. It is a well known fact that there are various kinds of charity funds spread over the whole of India. These funds must be amounting to some millions and if these are made use of in the creation of schools, hospitals and similar civic amenities in the National Housing Scheme, the memory of the donor will be perpetuated and the object for which these charity funds were earmarked would be well served.

It is revealed from the foregoing that though the figures appear to be staggering and beyond the capacity of the poor country like India, there is every possibility of the scheme being nearly self-supporting and that if there be any loss, it can be made up by a very small excise duty on the goods of the beneficiaries. In fact Government can make obligatory on the Insurance Companies to invest certain amount of their assets on National Housing Schemes, as at present, they have to invest in Government securities.

CHAPTER XMIDDLE CLASS HOUSING

It is very difficult to define the term "middle class". The criterion is not only the income but the mode of living. Their income ranges from a fairly large amount to much less than that of the average labour class family. Roughly speaking, this class is given to what is known as ministerial profession against the manual work of the labour class. The recruitment from this class ranges from primary teachers, gumastas, karkuns, shop attendants and such commercial workers to cashiers, head clerks, superintendents, and officers of business firms, as well as those of government and corporate bodies. The habits of life and interrelation with higher class together with proportionately low income combine to create a situation in which this class is sometimes more hard hit than the labour class.

This class may be roughly divided into lower, middle class and upper middle class. The rent-paying capacity of the former for their house requirement is so low that for all practical purposes their requirements will have to be provided by the State on the same lines as for the labour class.

The rest of the middle class stand on a different footing. The property sense of this class is so highly developed that they will like to own a house and will strain themselves for having it. Whether this sense is to be encouraged or not depends upon the future social and economic structure of the society. It is, however, presumed that for the time being at least this is not to be discouraged. There is another aspect of the problem. Many persons of this class have to be migratory and mobile in character for earning their livelihood. The costliness of land and construction will prevent a middle class man from owning his house particularly in large industrial centres. The problem, therefore, becomes different for metropolitan, suburban, and mofussil urban centres. Generally speaking, in metropolitan centres middle class persons will not be in a position to own houses but will be paying economic rent which will attract investment by capitalists. The flat or large tenement system will prevail and the authorities will have to adopt appropriate rules for safety, light, ventilation and sanitation. In the other two parts it will be possible for the middle class to have their own houses. Here the authorities will have to encourage private efforts.

These efforts are directed towards securing suitable building sites and the financing of the house. As emphasised in the foregoing, the development of land will remain under the aegis of housing and planning boards. The building site, therefore, will be available to all classes of people as detailed in chapter on Development. It will be necessary to provide proper zoning so that the middle class gets suitable and cheap sites without any danger of stratification or of development of inferiority and superiority complex. This will be secured by what can be called co-mingling method suited to Indian conditions.

The problem, therefore, is reduced to one of financing the construction of houses for the middle class, when once land is made available by the authority. The systems of house ownership are varied and differ with different locality and different persons according to circumstances of each case. Some of them are (1) Simple Hire Purchase; (2) Decreasing Temporary Insurance; (3) Co-Partnership; (4) Tenant ownership; (5) Simple mortgage. The bodies from which loans should be available are insurance companies, housing banks, realty associations and corporate authorities. The existing procedure

regarding loans by these bodies requires some overhauling under the projected system of national housing, e.g., the insistence of joint and several responsibility as an invariable condition will have to be modified. The same remarks apply to co-operative societies. With one of the main motive forces namely land being taken away by its provision under the aegis of the housing and planning board and the other effective motive namely credit being modified by modification in loan procedure, the formation of housing societies will have to be based on commutarian life or neighbourhood living or any such term by which instinct of segregation and sociability may be called. Such a change is likely to bring in professional and other such groupings as proposed by railway men and actually done by officers of the agricultural department in Nagpur. Another illustration of desirable new introduction is that of the system of decreasing temporary insurance. Here the principles of insurance and hire purchase are interwoven in a peculiar way. Such a system is perhaps new to India and even to the whole of Asia. It deserves adoption on a wider scale. Discussion of details of all the above mentioned items will be interesting and informative but it will perhaps be too unwieldy for this report and premature at this stage.

Problems arising from the provision of low rent flats by endowment funds, reconditioning of existing sub-standard houses by municipal compulsion under special legislation, positional value of land and automatic rent restriction, creation of natural interest for upkeep and tidiness by house-ownership, investment either before or after retirement, of spare money earned in service or business, in duplex houses for rent as well as residence and the like, are similar to the problems of upper middle class housing, and though they appear minor at this stage, they will require detailed attention at the time of execution.

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Most of the details for standards given in the foregoing, will apply to the middle class housing. As the houses of the upper middle class is left to private enterprise, it will be necessary to codify the standards clearly and in great detail, so as to make scrutiny and inspections effective. The main difference will be as under:-

Regarding housing accommodation, more rooms and larger floor area, will be required. The houses will be cottage or villa type as well as of duplex type but not generally of the row type. Fixtures and fittings will be a little more in number and of increased standard; e.g., there may be room for frigidare, or suitable cupboard for storing fresh fruits and vegetables, and dairy products. Similarly closets for clothes, safe-keeping arrangements for mechanical vehicles etc. may have to be provided.

These are some of the examples. The details are so varied and so many that it is neither possible nor necessary to compress the same in a report like this.

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## CHAPTER XI

LEGISLATION

No considerable work of a countrywide nature is possible without proper legislation. The various subjects discussed in this chapter will be an indication of the lines on which the legislation has to be brought into being. To make the recommendation real and definite, draft acts should accompany the report. But it will be too unwieldy and equally premature. Some of the items, however, which should find an important place in the Acts, are mentioned below:-

**(1) STATUTORY BODY:** The constitution of these bodies as well as their powers and duties will have to be given in detail and it is not too much to say that the success of the whole scheme will depend upon this item of the legislation.

**(2) POWER OF ACQUISITION:** Under this head will come all the usual items, with the addition of the widening of powers regarding insanitary and substandard houses and localities. In addition, the power of acquiring open areas will be such as to prevent the private owner or the speculative dealer from dictating and cheating the community and thus effectively preventing the community from carrying out large housing schemes. One can discuss here the question of the principle of unearned increment and the rights of the community to the same. But, suffice it to say here that the act will have to be carefully and fully worked to make the underlying principle effective in execution. The existing Land Acquisition Act was framed some years ago and was primarily conceived for the purpose of acquisition of lands, particularly for the purpose of roads and railways and such other service lines; though amended off and on, the basic structure has remained the same and will, therefore, require to be newly framed as soon as possible by the Central Board. Side by side with the question of powers of acquisition, it will be necessary to decide the principles of what may be called eminent domain and police powers. The line of demarcation between these two is so hazy, uneven and overlapping that many a time it is difficult for the community to effectively face an unscrupulous speculator. Though it is understood that the difficulties on this account are not many and persistent in India when compared to some foreign countries, it will be wise to forestall the same, particularly because there is every likelihood of the same obstructiveness being imported into India.

**(3) RESPONSIBILITY FOR DEVELOPMENT:** Most of the Acts in India today are not exhaustive enough on this point. The vested interests, nebulous ideas of most of the authorities and bodies concerned and vagueness of legislation have all combined to transfer to a less or greater degree the responsibilities on this account to the community. This part, therefore, will have to be properly incorporated in the Act.

**(4) BUILDING REGULATIONS:** The building regulations form an important part of the administrative activity of the local bodies. Had it not been for the unwieldiness of the report, a draft of the building regulations might have been appended. Ample power should be vested in the municipality by which it can require the demolition or reconditioning of a building which does not come up to the standard.

**(5) FIXATION OF STANDARDS:** This ought to form a part of the building regulations, and enactment will naturally go along with the same. The question of standards, however, is very important and has, therefore, been treated separately. A good deal of technical consideration along with financial one, is needed for the fixation of standards.

(6) CAPITAL RAISING: Housing on a National scale will require organised and planned husbanding of the national resources. The capital required for the purpose of housing on a national scale, therefore, will have to be guided by the principles of national and public finance fixed under national planned economy. All financial matters including powers for raising capital will have to be fixed and defined in the projected legislation.

(7) HOUSE LETTING: Housing created under National Service will bring in a variety of problems for house letting. It is presumed that labour-housing will come under public Service and its management will have to be ensured accordingly. The various problems and difficulties arising out of social, sentimental and economic conditions of the labour classes as well as the play and interplay of political and economic forces will require a sort of house-letting code, with, perhaps, legislative sanction behind it. Such a code will be one of the most difficult tasks set before the Central Planning Board; proper care and precaution in this behalf will, therefore, go a long way in obtaining ease and efficiency of the actual day to day management of National Housing.

(8) PREVENTION OF EXPLOITATION: Though Housing as National Service is an accepted ideal under planned national economy, private enterprise is not prohibited at least in the initial stage. It is likely that there will be cases in which the private owner is in a position of vantage. In such cases, it will be necessary to regulate tenancy, rent and standard; though the problem itself will not persist in so acute a form as it does today because of the competitive better and cheaper housing projected to be provided under National Service. It will have to be tackled in a fundamental way particularly because of the combined effect of positional value of the private-owned housing and the inertia and apathy of the labour itself.

There are other minor items which require legislative treatment; these are as follows:-

- (I) Management of housing provided by National Service
- (II) Inspection and control of the private-owned housing.
- (III) Prevention of diversion of the facility from the needy to the non-needy;
- (IV) Prevention of land speculation.
- (V) Change in the Insurance and Co-operative Act so as to give latitude for loans for middle class housing and for public loans for industrial housing.
- (VI) Enacting for co-operation between industrialists and experts for practical progress in industrial technique.

Though minor at this stage, these questions will assume great importance when the scheme is nearer initiation. For example, 11 Acts of the English Legislature providing financial help for housing under various forms failed in their effectiveness to reach the really needy families who are still unhoused in the majority of cases. It will be seen from illustrations like this that a great deal of care, greater foresight and still greater investment will be necessary before taking actual steps with regard to the National Housing Scheme.

CHAPTER XIIMATERIALS, LABOUR AND OTHER ASPECTS

The question of organisation of labour and material trade in connection with building industry is very important. It has been assessed that the number of labourers on constructional works and allied industries is next only to that in agriculture. Unfortunately, we have not been in a position to collect the necessary data. Statistics regarding imports indigenous manufacture and raw materials and labour employed in such industries will require the co-operation of various authorities and access to their records.

A list of articles required in connection with building industries is given in the Appendix 4. For the organisation of the industry the following has to be considered:-

- (I) What items should be produced on a mass scale?
- (II) What articles should be manufactured on a factory scale?
- (III) What should be the arrangement for marketing and distribution?
- (IV) How much mechanization of the carrying trade or transportation is advisable, looking to the general national interest and how much of it can be effected?
- (V) What means should be adopted for encouraging the local production of those articles that will have to be left out of mass or factory scale production?

These are items that require detailed and spot study.

The building materials are classified as articles (i) vital to the country (ii) necessary for making the country self-sufficient; (iii) amenable to large scale treatment; (iv) appropriate for nationalised industry; (v) suitable for industries that can be developed on the basis of assemblage and cottage industries; and (vi) articles that can be manufactured immediately on industrial basis.

Illustrative lists on the above-mentioned basis have been given in the appendix 5 a to 5 b.

Rough analysis of various items that go to make up the total cost of housing schemes has been given in appendix 6. It will be seen, therefore, that factory-scale production required for the State housing programme alone will be between Rs.4,000 to Rs.5,000 millions. This raises the question of adequacy or otherwise of the materials required for the housing schemes. The demand on building material at present is so fluctuating that markets in a particular case either become saturated or inadequate. Many a housing scheme in foreign countries received a severe set-back because of the sudden demand on a less elastic market. It is, however, to be noted that for almost all the materials for housing, the supply in India is potentially adequate. It will, therefore, be necessary to plan out production of materials ~~for housing, the supply in India is potentially adequate~~ before actually starting the projected housing scheme. It will, perhaps, be advisable to nationalise industries like: (1) iron (2) cement (3) water, sewage and other pipes, though the existing industry may not be touched except for some legitimate and desirable control. These industries depend upon the natural resources of the nation such as quarry, lime stone, clay deposits, coal, forest produce, ores and the like. The consumption of products of these factories is spread over all parts of the

country. These products are absolutely essential for the housing schemes as well as most of the schemes of the government, and semi-government bodies. A sudden demand on these industries will tempt them to increase the prices or they may not be able to meet the demand. Steps should, therefore, be taken to ensure a steady and cheap supply. Regarding self-sufficiency, though India is not up to the mark, taking proportion of the money value, however, as criterion, the situation is not so bad as is feared. But from National point of view even this drain is unwarranted and undesirable. It should not be difficult to manufacture these articles or their substitutes in India and ensure National self-sufficiency in building industry.

Regarding tools and plants required in construction, India is woefully deficient. If locomotives can be manufactured in India, there need not be any difficulty in manufacturing in this country the mechanical plants given in the list of the appendix 5 g.

To facilitate manufacture and marketing, it will be necessary to standardize the requirements and reduce the number of variations. It should be incumbent on the indenting department to adopt these types so that there may be economic load factor for the factories: as an illustration, out of the innumerable patterns of levels and theodolites, the Government of India have prepared specification for one type and a sort of monopoly of manufacture is given to a particular firm. A system like this modified from national point of view will enable the manufacture of almost all the mechanical plants, including mechanized vehicles thought to be necessary from the national standpoint for the carrying industry of the building materials.

The present is the most opportune time to establish factories for the said articles and plants; first because of the difficulty of import, secondly high prices, thirdly of the probability of not getting many of the imported articles for some time, even after the cessation of war, e.g. the British Government have banned the export of surveying instruments and the like.

Location of these industries will be a tough problem. The provinces will try their best to be self-sufficient and may over-rule other important, economic considerations. It is supposed, however, that there will not be any great difficulty in counteracting such centrifugal tendencies.

In addition to the industrializing effort, steps will have to be taken for improving and encouraging indigenous methods, e.g., though brick and pottery should be very much advanced industries in India in view of the fine alluvial clay being available in greater part of the country, crude and wasteful methods are followed which require replacement by scientific and systematic methods so as to obtain reduction in quantity of fuel and to secure maximum quality and strength.

The foregoing discussion has given a definite indication that the organisation of the building industry cannot be efficient and effective without standardisation, both from the point of the manufacturers and that of the consumers. It will have to be seen that the standards and specifications are suited to the purpose without/unnecessarily high or low. The number of forms and types will have to be reduced to the minimum so as to decrease the cost of production, e.g., pottery works are complaining that they have to manufacture gully traps and such other specials in a large number of types as each sanitary engineer specifies his own pattern.

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Same is the case with valves and hydrants. In addition to this reduction of redundant patterns, standardization is to be made for interchangeability. No serious attempt has yet been made on these lines, and it is high time that this should be taken up by the All-India Research and Standards Committee, that we recommend to be established. This board will be more or less the brain centre of the activity in connection with housing schemes and building trade. It should be the common meeting ground of the national planners, technical experts and, most important, the industrialists. It is hoped that the latter will cease to take short-sighted views and whole-heartedly co-operate with the Research and Standards Committee. As proposed under Legislation, necessary enactment can be undertaken so as to encourage or enforce references to this committee. It will not be very difficult to arrange for the finances of such a committee as there is every likelihood that it will receive good amounts by way of testing charges, consultation fees and advice money. The research section of the committee might feel the financial pinch in the beginning but it is hoped that the Central Housing and Planning Board will enable the research section to get over the difficulties in the initial stages.

The functions of the proposed committee, though self-evident, will cover a vast field. In addition to the primary function of preparing standards and type-specifications, it will render statistical service and work as a clearing house of information. It will test the various materials as exist and suggest the possible ways of improvement. It is expected to discover new materials wherever possible. It will be its duty to unearth old recipes and modes of production and methods of construction. Had there been such an active committee functioning the secret of the colour technique of the Ajanta frescos or the timber ribs of Corla caves or of the rustlessness of iron pillar at Delhi, and the like, would have been found out, preserved and brought into practical use. It has been recorded that some blacksmiths in the southern part of India were actually smelting rustless iron in living memory. Even now, the colour prepared out of ordinary materials such as pomegranate skins, oval branches, myrobalans and the like are such that they are not affected by acids when applied to woolen threads. The Research Committee is expected to bring about a happy marriage of such traditional knowledge with modern scientific progress. Large scale experiments will have to be undertaken as is necessary and peculiar to building industries. Research from the house-using point of view will be necessary so as to invent devices to make house-keeping easy and house more liveable and less costly. The Committee will have to subject all proprietary brands to searching investigations so as either to expose their fictitiousness, or to emphasise their good points. Private experimenters and individual corporate bodies have made experiments; e. g., a new type of cheap cement for rural use, salt as dust-absorber, cotton for strengthening roads, molasses for providing flexible and dust-proof road surfacing, traditional lossy plaster being glazed tiles and the like have been brought to notice. Inventions and researches on these lines will have to be undertaken and once the usefulness of the committee is established its continuity and legislative and central authority will be established with benefits to all concerned.

The organisation of labour connected with building trade is comparatively less difficult because of the fact that the building traditions are age-old. In most of the mofussil towns and much more in rural areas, the hereditary artisan is the chief technician. Unfortunately, their knowledge has become more or less fossilised and stagnation has occurred. Education with professional bias is urgently necessary in such

a way as to broaden the outlook of such workmen without losing inspiration from their traditional knowledge. The potentiality of labour for building trade is very great so as to give equally efficient and skilled workers as in any other country in the world. The main obstruction in the way of proper expression of malleability of the Indian craftsmen, technicians, and engineers is the constant dinning into their ears that they are not sufficiently skilled. Given equal opportunities, Indians will stand second to none in any field of human activities of the world. To preserve what is best and to progress for the better, the age-old system, with necessary modification, of early continued and concentrated apprenticeship should be revived in a regular national and recognised basis. The building trade is one of those trades where due to scattered nature and non-amenability to complete mechanization as in factory, labour plays an important part. From quarrying to construction, most of the processes require dexterity of hand and limbs, rather than a great deal of theoretical knowledge. Barring some big industrial cities, all the urban and rural areas will have to depend upon manual labour. For this reason, systematic apprenticeship and organised recruitment shall have to be codified by the housing and planning boards for all types of skilled and unskilled labour. The question such as standard of wages, formation of trade unions and the like are so interlocked with other questions of general urban and rural labour that it will have to be left to those in charge of labour questions in general. The question of output, however, stands on a different footing. There is a general impression that the output is decreasing with the lapse of time. The fact has not been convincingly proved. Cases of diminution of output have been known to be connected with poverty and general lowness of vitality, but not absolutely with want of skill. On the other hand decrease in the sense of duty appears to be a growing contributory cause to the decrease in the output. This is a fit subject for the research committee to investigate. Another cause of decreased output is constant fear of unemployment if work is finished earlier. Competent authorities have found that to ensure the proper output and work according to decided tasks, the worker must be ensured almost permanent employment which will go to increase his vitality and contentment and consequently his output. With national economy planned, and a big housing programme, this should not be difficult to achieve.

There are some minor aspects connected with the subject of National Housing. Many a housing scheme in foreign countries have been completely upset by the formation of price rises, which brought up the prices to unusually high levels. Another point of foreign experience is too much of housing activity in one area along with paucity of the same in another, with the resulting dislocation. Such constant shifting of labour and mechanical workers has to be avoided.

The operation of red tape has adversely affected many a housing scheme. From another point of view if the same brain is asked to evolve designs for different places there is every likelihood of dullness and absence of vitality creeping in. Stereo type buildings will affect both the utility and the beauty of whole locality. It is suggested, therefore, that housing and planning boards will take advantage of the experience and knowledge of all those who are willing to contribute their quota in National housing; i.e., Private practitioners like architects and engineers should be given opportunity to give their best in the evolution of forms of constructional methods and kindred matters.

This brings the question of architecture. The uniform layman has nebulous ideas about it, and he appears to be

presuming that architectural beauty is not a necessity but a concession to be relegated to the background of the problem. It is to be emphasised that architectural beauty is neither a luxury nor a costly necessity. Beauty costs no more than ugliness. It is recommended that in all the programmes of housing and planning boards, due place should be given to the demands of architecture in deciding both the internal and external form. In doing this, every care will have to be taken that there is a genuine Indian feel both inside and outside the house. Any disregard on this count is bound to strike a discordant note. This point was emphasised by the lover of Indian Culture by both Europeans and Indians headed by Sir Francis Younghusband in their petition to the Secretary of State. The facts addressed therein were proved to the hilt by an independent Government Committee; but the then Secretary of State did not act according to the inevitable conclusion. A warning, therefore, is necessary so that the mistake may not be repeated and an excellent opportunity available once in a century or two may not be lost for ever.

Construction programme has now been recognised as a stabilizer of economic forces. It has been computed that for each worker employed directly on a construction programme, two or more are given employment indirectly in the manufacture and transportation of building materials and equipments. Moreover, still further employment is created as a result of the demand exercised by these workers for consumers' goods. The secondary employment thus created by construction programmes during depression have been calculated as being perhaps roughly as large as, the primary employment given directly or indirectly by construction expenditure. It has been found that there are more or less regular cyclical periods of depressions and booms. It has also been noticed that depressions create panic and make it more depressed, with the result that there is considerable disturbance or confusion. It is worthy of consideration whether the National Housing programme will allow both contraction during prosperity and enlargement during depression so as to obtain an even flow of the economic currents.

This should not be mixed up with the idea of relief works - the main purpose of which is to give work to persons threatened with starvation. The purpose here is to provide a definite stimulus to the economic system as a whole and to stabilize the same by reducing the unevenness of cycles of depression and prosperity. The success of such a policy will depend upon the thoroughness with which advance plans - engineering, financial and administrative - are prepared, so that sufficient flexibility of the programme can be obtained and utilized as a controller of economic forces. If this method is judiciously adopted and comprehensively executed, there is every likelihood of reduction in cost and stability in the standard of living.

CHAPTER XIIISUMMARY OF CONCLUSIONS

Housing conditions in rural India are very unsatisfactory and those in cities and industrial towns are worse. National Housing requires to be tackled on an All India basis. The term 'Housing' includes not only the provision of comfortable shelters but also of such surroundings and services as would keep the worker fit and cheerful for all the days of the year.

It is recommended to create statutory authorities namely (1) Central Housing & Planning Board; (2) Provincial Housing and Planning Boards. The former will be concerned with general principles, policy, programme, finance and technique on broad lines. The latter will guide and control all schemes but not their details. Both will undertake necessary legislation. The initiative and execution will be delegated to local authorities either District Council or Municipality or a Special Statutory body or a Statutory Sub-Committee.

Women's role in National Housing being very important, arrangement is recommended to be made so as to give an effective voice to the woman in the actual execution of the housing and planning schemes.

Rural housing has to be taken up in coordination with rural reconstruction effort. There shall be regional as well as local amenities, on a pre-planned basis including improvement and expansion. The villager's house will cater for the functional requirements of the occupier and will have necessary structures and fittings so as to make his life healthy and happy. The villager's contribution will be in the form of labour and that of the State in the form of materials generally. Rural housing will be based on ownership and not on tenancy. There shall be mass propaganda in various forms by way of help and guide. Construction will be after models as fixed by Central & Provincial Boards modified by local authorities.

The economic condition of the workers will not permit them to pay a rent for their housing which would give adequate return to the private individuals who may be interested in providing such housing. It is, therefore, recommended to be a State concern, under the aegis of the planning and housing boards. There is no restriction on private enterprise suitably controlled but the main burden will fall on the State. Labour housing by employer is not recommended.

For improvement and slum clearance removal of industries to the outskirts, wherever possible, is recommended. Substandard and insanitary houses as well as insanitary areas are recommended to be removed on pre-planned basis. Vertical development may be adopted to wipe out overcrowding, substandard units and shortage wherever removal is not feasible.

Development is to be co-ordinated with improvement and slum clearance both in planning and finance. All virgin lands are recommended to be developed by the State alone on the basis of master plan. The land should bear the cost of all necessities and most of the amenities, to be provided on the recommended scale. All indiscriminate expansion should be thoroughly and firmly stopped. Efforts should be made for creating self-sufficient and self-supporting industrial townships wherever possible. All new industries should be established on this principle.



The minimum accommodation for a family should be as under:-

Main room	=	15'	x	10'	=	150 sq. ft.
Kitchen	=	8'	x	6'	=	48 sq. ft.
Verandah	=	9'	x	6½'	=	58½ sq. ft.
Bath room	=	7'	x	3½'	=	24½ sq. ft.
W.C.	=	4'	x	3'	=	12 sq. ft.

Standards for site, streets, amenities, house, materials, fixtures and fittings should be on the basis recommended in the body of the report.

The ultimate national requirements of such tenements is estimated to be 10 millions of which one fourth, i.e. 2.5 millions are proposed to be constructed in the first ten years' plans. Overall cost of each tenement is assumed to be Rs.1,250/-. The finance required in the first ten years will be Rs.3,125 millions, proposed to be raised by floating loans.

There is every likelihood of a net return of about 3% on the basis of a rent of 10% of the family income which is bound to increase on account of planned economy and industrialisation. If there be any deficit, it is recommended to be made up by an excise of 1% ad valorem on the total output of building industries and allied trades as well as of the industries whose labour is proposed to be ultimately housed.

Legislation is recommended to be undertaken on a comprehensive scale so as to provide ample powers and fix onerous and optional duties on the statutory bodies recommended to be created.

Thorough organisation of labour and material is recommended to be undertaken in the order of importance. The articles vital to the country and necessary for self-sufficiency should be taken up by planned industries at once. Present opportune time should be utilised for starting easily developable industries. Standardization for quality, interchangeability, avoidance of redundancy, and for encouragement of national industries is to be taken up at once. An All-India Standards and Research Committee is recommended to be established. Co-operation between ~~national~~ national planners, technical experts and the industrialists is to be emphasised.

A suggestion is made to the effect that National Constructional programme might better be arranged so as to work as a stabilizer of public finance.

APPENDIX I.

Questionnaire.

QUESTIONNAIRE ISSUED BY THE HOUSING SUB-COMMITTEE  
OF THE NATIONAL PLANNING COMMITTEE.

- (1) How far would it be correct to regard, in a system of planned National Economy, the provision of Housing accommodation for the people a matter of National Service, or public Utility, and to what extent it would be justifiable to leave it a field for private, profit-seeking enterprise ?
- (2) If you consider the provision of Housing to be a Public Utility Service which ought to be operated by the community collectively, or by any delegated authority within the community, what differentiation would you make as between Housing in Towns and Cities and those in Villages ? (N.B. For the purpose of this question a Town may be taken to be a place where at least 5,000 people aggregate live habitually; and all those places where less than that number live may be considered as Villages) ?
- (3) What are the authorities which, in your opinion, should be required by law to provide adequate Housing accommodation for the people in Towns, assuming the Service to be operated as a Public Utility Enterprise ?
- (4) What powers in general of acquiring space, developing locality, providing all the amenities and services of civilised life raising capital, letting houses when built, making bye-laws for the comfort, safety, and convenience of the inhabitants of these houses, etc. would you entrust to the public Authority required to provide Housing ? And how would you entrust them ?
- (5) If Housing in Towns (or Villages) is left to be provided by private, profit-seeking enterprise, what regulations, if any, would you suggest for the control and supervision of that enterprise, so as to prevent undue exploitation of the tenants of such houses? with special reference to the scale and payment of rent, the provision of amenities and comforts as well as conveniences of life to the residents, and due attention to safety against the usual risks of life (e.g. fire). What do you think to be the proper return for a private enterprise engaged in housing for working class ?
- (6) How far would it be desirable as well as practicable to provide housing by means of caste or communal or other forms of Co-operative Building Societies, with suitable assistance and financial aid from the community collectively. How far would it be desirable and practicable to provide such housing by Private enterprise ?
- Do you expect any untoward unexpected evil consequences to arise (e.g. the revivification of the caste system or the intensification of the communal antagonism or 'suburbanism', or undue stratification of the community in a given place into different ~~segments~~ ~~divided from one another by differences of conditions~~ ~~or of social status~~) from the method of housing mentioned above ?
- (7) If housing in a Town (or village) is required to be provided by the local Municipal (or District) Council, what safeguards would you suggest against the possible development of some, or all, of the evil tendencies mentioned in the preceding question ?
- (8) How far in your judgement is it right and desirable to insist upon every considerable employer of workers to provide his own housing accommodation for each of his workers? What precautions would you advise to guard against a possible abuse of this facility, or privilege to workers housed by their employers ?

(9) What are the sources and methods by which the finances needed for providing Housing on a nation-wide scale, together with the amenities and services of modern civilised life, would be supplied ?

(10) What precautions would you adopt against the Housing provided as a National Public Utility Service being abused, or perverted, to become an instrument or symbol of class exclusiveness, or caste segregation of any elements of the population, without at the same time interfering unduly with the conveniences of the average citizen in selecting his neighbours ?

(11) What P.C. Do you think reasonable in the total cost of building for several items such as (i) Land (ii) Roads & Sewers (Development of the land area), (iii) Labour, and (iv) Building-materials ?

(12) What inducement can you offer for a private enterprize to take up housing for labour class people ?

(13) Do you think Insurance Companies should finance housing schemes as colonies for working classes or as Town Planning scheme and under what safeguards ?

(14) What criteria would you adopt for judging the suitability of housing accommodation, and its adequacy, when provided by some Public Authority as a National Service, as between the several sections of the community? i.e. capacity to pay rent, number of persons to be housed in a given unit, the kind of life they would have to lead according to the weather or altitude or the use to which the house is put ?

(15) What standards would you lay down and how to judge of the suitability and adequacy of housing accommodation with due regard to provision of comforts, conveniences and amenities of civilized life including services such as Water Supply and Sanitary Equipment to the people housed, to the numbers housed and to the kind of work to be done in that house ?

What authority should lay down such standard and under what conditions?

(16) Besides Housing for the dwelling of people with other buildings such as Reading Rooms, Gymnasiums, places of worship, Hospitals, etc, would be needed, in accordance with the plan, which the Planning Authority must ensure being provided in the different parts of the country in an adequate degree ?

(17) How far would you suggest Housing accommodation provided in accordance with the plan, should also pay adequate regard to the inclusion of such fixtures and fittings in every house as would render house work quick and easy ?

(18) In constructing Housing and providing all its attendant services and amenities, on a mass scale what room, do you think would be available for securing Architectural beauty in design and appearance, as well as all convenience of dwelling places ?

(19) What other considerations would it be necessary to be borne in mind, besides those already indicated in the preceding question for securing the ease and comfort of the woman in house, and the children of all classes, particularly in densely populated areas of Industrial towns ?

(20) Would you please add a typical plan of a rural, as well as an urban housing-building, for an average family of two adults and three children and one dependent, which you consider fulfil the conditions and desideratum you have laid down.

(21) What considerations do you think should be particularly borne in mind in laying out the housing areas in any considerable centre of population where a multiplicity of Industries have been developed, and congestion, the population has occurred so as to reduce this congestion, and set apart appropriate area for appropriate purpose, providing all amenities of civilised life ?

(22) By what agency would you suggest should such a scheme of Town-Planning, or proper layout of residential areas should be carried out, including the provision of all the necessary services such as transport and amenities of civilised life, some public Authority, or private Corporation ? If the latter, what precautions would you suggest should be adopted to guard against undue profiteering on the part of the private proprietors ?

(23) What are the important industries for the production and supply of Building Materials, which must be established in the country, so as to facilitate the provision of the necessary Housing Accommodation, in accordance with the National Plan, most efficiently and economically ? Do you think that any such important industries shall be run as national concerns ?

(24) What building materials, to what extent, and from what countries, are imported into this country ? Where, and in what quantities, are the basic materials needed for such Industries available in India ?

(25) How far do you consider it would be possible to distribute, in accordance with the National Plan, the location of these Industries in the several parts of the country, so as to make each unit, as far as possible, self-dependent in this regard, or able to provide its needs most efficiently and economically ?

(26) To what extent, in your opinion, is the country adequately provided with the skilled labour needed for the service of Housing and Roads, as well as other services and amenities of civilised life connected with good housing provision ? How would you secure the supply of such skilled, trained, or experienced labour, if you consider its available supply inadequate ?

(27) To what extent, the present production in India of essential building material sufficient to meet the demands of National Housing ? In what directions should it be accelerated ?

(28) Do you think it advisable to standardize the quality of Building materials by establishment of Research Board either provincial or All India one, and how do you propose to finance the expenses of such Boards ?

Signed (S. P. Joshi),  
Jt. Hon. Secretary,  
Housing Sub-Committee,  
of National Planning Committee

APPENDIX 2.

STANDARDS IN FOREIGN COUNTRIES.

Extracts from P.E.P, 'Housing in England'.

The scale resulting from the adoption of this basis, with allowance for Sex separation, above ten years of age, is as follows:

(a) Man and wife, two rooms. (b) Man and wife plus one child, two rooms. (c) Man and wife plus three children of the same sex or under 10, four rooms. (d) Man and wife plus four children of the same sex or under 10, four rooms. (e) Man and wife plus two children of different sexes, three rooms. (f) For man and wife and more than two children of different sexes; add rooms so that not more than three children of one sex need sleep in one room. (g) For one extra adult, add one room. (h) For two extra adults of the same sex, add one room to (a) or two rooms to (b) or one room to (c). (i) For two extra adults of different sexes, add two rooms, except where a room can be shared with a child under 14, or without the standard of one and a half per room being exceeded.

Structure and Equipment:--

The above purely numerical standard must be used in conjunction with other criteria which cannot always be numerically expressed. It is suggested that these criteria should be:--

(a) Size of Rooms : No room should be counted in the calculation of a minimum which has a floor area of less than 90 Sq.ft. in which the height to the ceiling averages less than 7 ft. 6 ins. or in which there is not a minimum space of 360 cubic feet per person. Rooms of 65-90 Sq.ft. floor area may only be reckoned as half rooms.

(b) Structural Separation : No dwelling can be included in the minimum which involves permanent use by a family of rooms which are not structurally separated from those of other families. (The Census definition of a structurally separate dwelling is : Any room, or set of rooms, intended or used for habitation, having separate access either to the street or to a common landing or staircase. Thus each flat in a block of flats is a separate unit, a private house which has not been structurally sub-divided is similarly a single unit, whether occupied by one family or several families. But where a private house has been sub-divided into maisonettes or portions, each having its front door opening on to the street or on to a common landing or staircase to which visitors have access, then each such portion is treated as separate unit).

(c) Light and Air : The angle from the lowest inhabited floor level of any dwelling or block of dwellings (measured from the outer face of the wall) subtended by any obstruction to light should in no case exceed 45 degrees. Windows must not be smaller than one-tenth of floor area, with a 50 per cent minimum opening. All bedrooms with an air-brick of 9 in. by 9 in. 50 per cent open, or the equivalent in ventilation.

(d) Approach : If the dwelling is on an upper floor it must be reached by stairs which are safe and reasonably lit, and must not be more than four storeys high, unless a passenger lift is provided without extra charge. There must be a paved way from the street by which access is gained.

(e) Sanitation : There must be a separate W.C. for each family, within the structurally separate dwelling. There must be efficient and direct connection with the main drainage system of the area.

(f) Water : There must be a constantly available supply of safe drinking water laid on within each structurally separate --

dwelling, at a rate which will allow the reasonable needs of the family to be satisfied at a charge that they can afford to pay.

(g) Artificial Lighting : There must be provision for lighting adequate to prevent risk of fire or injury to eyesight in ordinary conditions of use, at a rate which will allow the reasonable needs of the family to be satisfied at a charge that they can afford to pay.

(h) Cooking : There must be provision for cooking of a capacity adequate to the maximum size of family for which the dwelling is appropriate, in working order, at a rate which will allow the reasonable needs of the family to be satisfied at a charge that they can afford to pay.

(j) Heating : There must be provision for heating at any rate of the living room, with reasonable efficiency, at a rate which will allow the reasonable needs of the family to be satisfied at a charge that they can afford to pay.

(k) Washing and Bath : There must be provision for washing clothes and for bathing the body within the building, at a rate which will allow the reasonable needs of the family to be satisfied at a charge that they can afford to pay. Where properly managed communal arrangements for washing and drying clothes are available at the same or less cost within the distance of ten minutes' walk these may be considered adequate.

(l) Storage : There must be provision for clean and hygienic storage of a limited quantity of fresh food, for utensils, and for storage of coal or coke where required. There must be proper facilities for drying clothes, preferably indoors, so that they need not be dried in the kitchen or sitting room.

(m) Repair : The structure as a whole and all essential equipment must be kept within a state of repair which is safe and serviceable for the occupants. There must be machinery for seeing that repairs for which the tenants are liable, as well as repairs for which the landlord is liable, are satisfactorily carried out and for redecoration when necessary.

(n) Refuse : There must be adequate hygienic provision for the temporary storage and for the regular collection of refuse, & for the cleaning of approaches to dwellings.

(o) Vermin : Damp, rats, bugs, cockroaches and fleas must not be present.

(p) Management : There must be a routine arrangement for hearing and dealing with complaints at reasonable intervals, and for the regular and efficient inspection and repair of the property.

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EXTRACTS FROM REPORT OF THE BOMBAY RENT  
ENQUIRY COMMITTEE.

It is necessary that a minimum standard of amenities should be prescribed by law. It should be made applicable even to existing buildings, in so far as it is practicable. The amenities which should be compulsorily provided for are as follows :-

(i) There should be no back to back houses and in a house no back to back tenements with one-room. Each such tenement should have only one entrance with provision of for through ventilation.

(ii) A one-roomed tenement with a minimum size of 180 Sq. ft should have a small partition wall, not more than 6ft. in height, to divide the kitchen from the front portion of the room.

It should have a 'mori' or 'nchani' and a loft. The flooring should be of cement concrete, shahabad stone or any other material impervious to damp. The height from floor to ceiling should not be less than 10 ft.

(iii) The length of a chawl should not be more than 125 ft. in any single direction exclusive of the area required for latrines, washing places, bath-rooms, etc. On every floor, for every 4 rooms, there should be one latrine, and one washing place at least of 16 sq.ft. in size. There should also be on every floor two separate closed bath-rooms, one for men and the other for women; a direct water-connection and a metal dust-bin with a cover for depositing refuse for every 5 rooms.

(iv) A building should be provided with a storage water tank. It should have its common conveniences and passage adequately lighted. The entire building should also be whitewashed at least once a year.

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AMERICAN STANDARDS .

First - The average size house desired is between 5 & 6 rooms. Second - Small kitchens or kitchenettes are objectionable. Kitchens large enough for general dining purposes are preferred. Even the tenants of better grade houses, in which separate dining rooms were provided, dined a portion of the time in the kitchen. In the few houses where provided, combined dining and living rooms were held in disfavour; in many of these cases, the people managed to use some other room for dining, although such space was manifestly too small, and resulted in serious crowding.

Third - Built-in features, such as buffet, china-closets and book-cases, are not generally desired, except in the higher grade house, because most tenants have furniture which serves the same purpose; and such attached facilities result in a lack of space for furniture. The addition of these, moreover, is to be discouraged upon the standpoint of cost. While aware that arguments have been advanced in favour of these built-in features, on the basis that they permit a saving on the part of tenant by relieving him of necessity of the purchase of furniture, the reasons for their omission are of great weight.

Fourth - Objections are raised to single bedrooms; many people using double beds only. When only two bedrooms are provided, they should be double rooms; when three or more are used, it is rarely safe to plan more than one single room, except in houses of eight or nine rooms and houses designed for lodgers.

Fifth - Objection is raised to having the refrigerator in the basement; a space convenient to, but not in the kitchen, being requested.

Sixth - A grade entrance to a landing on the stairs, running from the first floor to basement, is favourably commented upon. Refrigerator space may be arranged off this landing as an added convenience.

Seventh - If the cellar contains a furnace, it has been found that, in order to keep fruit and vegetables, a space should be partitioned off for this purpose. This compartment should have no window, but should have outside ventilation by running a 2 in. gas pipe through the wall and placing a wire nesting on the inside, to prevent insects and mice from entering. Where porch foundations are constructed of masonry walls, this space forms an admirable fruit closet. This, however, entails additional expense, as the porch foundation must be run down to full cellar depth, instead of just below frost line, and a door way provided into the cellar.

Furniture Requirements :- To intelligently recommend minimum rooms sizes, it will be necessary to know what they are to contain in the way of furniture. To that end the following list and size of furniture is offered :

Living Room  
Piano : 5'-6" x 2'-4" x 4'-8"  
Table : 2'-0" x 3'-6"  
3 Chairs : 20"x18"  
Or  
One Chair and Davenport :  
6'-0" x 2'-4"

Bed Room (double)  
Double Bed : 43-62x 6'-6"  
Dresser : 3'-6" x 2'-0"  
Other Piece : 38-0" x 18-10"  
Two Chairs : 16" x 18"

Dining Room.  
Table : 54" diameter  
Buffet : 5'-0" x 18-10"  
Six Chairs : 16" x 18"

Single Bed Room.  
Single Bed : 3'-0" x 6'-6"  
Dresser : 3'-6" x 2'-0"  
Other piece : 3'-0" x 18-10"  
One Chair : 16" x 18"

In addition to giving space for the above listed furniture, the wall space will be interrupted by windows, doors and hot air registers.

Minimum Room Sizes : In the living room, dining room and bedrooms, the following minimum sizes have been prompted by a careful study of a large number of satisfactory plans.

A living room should be at least 12ft. by 14ft. exclusive of any encroachments, such as closet space or portion of stairway issuing from living room.

A dining room should contain not less than 120 Sq.ft. with 10 ft. the least possible dimension.

A double bed room should contain not less than 120 sq.ft. the smallest dimension being not less than 9 ft. 6 inches.

A single bed room should not be less than 80 Sq.ft., the smallest dimension being not less than 7ft. 10 inches.

The bath room should not be less than 35 Sq.ft., with a minimum width of 5ft. In such a room, the fixtures would be placed along the wall the long way of the room. The tub, which should measure 2 ft. 6 in. by 4 ft. 6 in., would take 2 ft. 6 in. space, plus 1 in. for clearance, or 2 ft. 7 in.; the wash stand, measuring 18 in. by 21 in. would require 2 ft. 0 in. wall space, and the toilet, measuring 20 1/2 in. width of low down tank, would require 2 ft. 0 in. wall space; or a total length of 6 ft. 7 in. necessary wall space to house fixtures. This permits 5 ft. margin to work in, which allows for irregularities in roughing - in of plumbing or general construction.

The kitchen area depends on several factors. From a survey of eighteen house plans, in which a separate dining room was provided, it was developed that, in an average size house, about 17 per cent. of the entire first floor area was used for the kitchen. Assuming a house 24 ft. square, or 527 Sq.ft. in area, the allowable space for kitchen would be approximately 98 Sq.ft. Being guided by a further stipulation that the room shall be not less than 7 ft. in width, the greatest possible perimeter is 42 feet.

The requirements to be met in a kitchen are :  
(a) a door to rear porch; (b) a door to dining room; (c) a door to cellar; (d) at least one window (preferably in a wall other than the wall with outside door); (e) a kitchen case which, when no other cup-board or pantry is provided, should measure 5 ft. in length; (f) a standard sink and drip board, measuring 5 ft. in length; (g) space for stove which, when placed in corner of room, requires 6 ft. of wall space. These various items require a total of 30 ft. of wall space in a room with 42 ft. The 12 ft. remaining is divided into small spaces between the various items listed.



However, by careful designing, it is often possible to reserve enough of this space for a table, 2 ft. by 3 ft. It will be seen that in a kitchen, using the minimum width of 7 ft., it will be difficult to place the table so as to sit around its four sides.

From these observations it will be apparent that the greatest care is required to design the small kitchen, and that the use of this kitchen for dining is almost impossible.

Having arrived at the minimum sizes of first floor rooms necessary to accommodate average furniture, similar detailed studies may be made for the second floor. A summary of such tests has been made after a review of the tables giving data on family dwellings, prepared by the United States Housing Corporation, & also by a careful study of its standard plans. The area of all bedrooms and bath, excluding closets, trunk rooms, storage spaces and stair halls, should be 72½ per cent. of the total area of the second floor, measurements in all cases being to inside finished walls. Should a plan fall slightly below this percentage, it need not necessarily be rejected, and some plans may be found to give higher percentages; but, striking an average, the plans should realize the percentage-given.

Recommendations of Authorities for comparison :- Various views have been expressed as to what should constitute minimum requirements for a satisfactory house. That there should be a difference of opinion among those who have made a study of the problem is easily understood when we realize the divergent characteristics of humanity. Furthermore, the variations represent unquestionably views as to different classes of dwellings desired. Some of those are abstracted in the following paragraphs.

**Veiller's Views.-** Houses for skilled workers at WilliamSPORT, Pa. Sawyer Park, recommended by Mr. Lawrence Veiller, Secretary, National Housing Association, contain the following features :

Every house has a well lighted and ventilated cellar, with concrete floor and a hot air furnace, with pipes to each room on the first and second floors. Bathroom has porcelain tub, wash bowl and toilet fixtures. Kitchen has a sink and porcelain wash tub. every house has front porch and an entrance to kitchen. Houses are piped for gas and wired for electricity; clothes closets are provided. In addition to the above, a kitchen cabinet and a linen closet are recommended for each house.

**Gorwben's Recommendations.-** The opinions of William Groben, of Ballinger and Perrot, Architects, of Philadelphia, Pa. are as follows:

Essentials for unskilled, low paid workmen's houses are permanent water-tight construction of walls and roof; sufficient sunlight and ventilation, and windows in every room. Private toilet with sanitary water closet, having sewer connection; sink in kitchen, with running water and sewer connection, are necessary. Gas or electric light and proper heating apparatus are required. Combination living room, dining room and kitchen; bed room for male children; bed room for female children, are the minimum requirements.

Essentials for skilled, high-paid workers' houses contain the above, plus cast iron enameled bath tub, with running water and waste; wash bowl in bathroom with tub and toilet, with hot water supply; and a living room separate from dining room and kitchen.

Accessories called for as essentials by some skilled, higher paid American workmen consist of cellar, laundry tubs, front porch wall-paper and tiled bathroom.

**Allen's Ideas.-** The recommendations of Leslie M. Allen, of the Alberthaw Construction Co. contain the following as housing essentials:

Water-tight roof, walls and floors; separate bedroom for parents; separate bedroom for male children and for female children; living room for cooking, eating and general day use; uninterrupted sunlight and ventilation through windows in every room; suitable

-42-

heating arrangements; private toilet room, with sanitary water closet and sewer connection; sink in kitchen with running water fit for drinking, and waste.

Further additions required by the American family are cellars, closets, bath tubs with running water, window screens and separate parlor.

Desirable improvements include porch and verandha; lavatory bowl; hot water, supplied to bath tub and bowl; window shades & window blinds; wall paper; and laundry tubs.

Kitham's Opinions.- The views of Walter H. Kitham, of Kilham & Hopkins, Architects of Boston, are :

The question then arises as to what constitutes fundamentals. I should say light and air, hot and cold water; facilities for bath tubs, even at the expense of leaving out a wash bowl. Refrigerator space, and as many bedrooms as possible. I should not so class furnaces, piazzas, fire places, parlors separate from the kitchen, nor set wash bowls. I am not so sure of the necessity of set washtubs in these days of wet wash laundries. Kitchens must have accommodations for simple stock of groceries, either in pantry or in a cabinet of some sort.

U.S. Dept. Labor Standards.- The following were promulgated by a committee of architects and civicists :

Row or group houses normally not to be more than two rooms deep; no living quarters in basement; every bedroom to have a clothes closet; every room to have at least one window opening directly to the exterior; minimum height of room, 8 ft. minimum areas; bedrooms, 80 Sq.ft. parlor, 120 Sq.ft. dining room, 108 Sq. ft. kitchenette, 70 Sq.ft. where there is no dining room kitchen should be 108 Sq.ft. toilet and bath for each house or apartment.

Albany Health Dept. Regulations.- The following are quoted from the published ordinances of this City :

Each room must have at least one window with area of 12 Sq. ft. no room shall be less than 90 Sq.ft. in floor area, nor less than 7 ft. wide; no ceiling in dwellings shall be lower than 8 ft. 6 in. each toilet room requires 6 Sq.ft. of window space opening to outside; each dwelling shall have one sink with running water.

Ontario Housing Committee Objects.- The following is quoted from the report of this Citizen's Committee, issued in 1918 :

There must be some definite classification taken as a basis in formulating standards. Careful investigation of living conditions has established certain requirements as essential, and others as desirable. There will undoubtedly be some criticism of any attempt to classify essentials, and there is bound to be diversity of opinion, but for our purpose the essential features may be summarised as follows :-

- I. Sufficient land to give each family privacy and plenty of air.
- II. Water-tight floors, walls and roof.
3. One or more rooms for cooking, eating & general use.
4. Bedroom for parents' use.
5. Bedroom for male children.
6. Bedroom for female children.
7. Provisions for toilet, with sanitary water closet and sewer connections.
8. Running water supply fit for drinking.
9. Kitchen sink, with waste connection to sewer.
10. Uninterrupted daylight and ventilation, for windows in every room.

Additional features which are so desirable as to be almost essential are :

1. Bathtub and lavatory, with hot and cold water supply.
2. Laundry tubs, with hot & cold water supply.
3. Direct sunlight in all rooms.
4. Second room in addition to that used for cooking.
5. Clothes closet.
6. Porches and verandahs.

Future additions of desirable features would include :

1. Electric lights.
2. Separate dining room.
3. Cellar.
4. Furnace for heating.

Some comment may arise on the omission of cellar from the list of essentials. There are those who claim that the cellar is essential for the storage of fuel, canned fruit, vegetables, etc, and that, since foundation walls are necessary, it costs no more to provide a cellar than to omit it. This latter question will be considered along with the following items entering into the house construction. Regarding the storage of fuel, etc.; a careful survey of conditions will disclose the fact that with many families the income will not provide sufficiently large quantities to require a cellar for storage. On the other hand, where cellars are provided, they will frequently be found to contain a miscellaneous assortment of unsanitary rubbish, which constitutes a serious fire menace.

Data of U. S. Bureau of Labor Statistics .- As indicative of the kind of houses most generally employed in industrial developments, the data of the United States Bureau of Labor Statistics may prove both instructive and interesting. An investigation covering two hundred and thirteen separate companies, including subsidiary companies of large corporations, showed the number of men employed was 466,991, of whom 160,645 or 34 per cent., were accommodated in houses controlled by the companies. Of the 53,176 individual dwellings considered, it appears that 25,582 or 48 per cent. were single dwellings, 18,871, or 36 per cent, double dwellings, and 6,014 or 11 per cent., row dwellings.

It is interesting to note in passing that, in the early stages of industrial housing, as, for instance, in the urban New England mill tenements, the row type prevailed, with the double dwelling next most common. The proportion of the row type shows a steady decline as industrial housing has developed, although now there is a growing appreciation of the group dwelling and to some extent of the row type of dwellings.

As regards the number of rooms, it was found, in the aforementioned investigation that 15,672 houses, or 30 per cent. had four rooms; 9,413, or approximately 17 per cent, had five rooms; and 9,127, or approximately the same percentage, had six rooms. It is apparent that the typical dwellings contained four, five or six rooms. It does not follow that these proportions are for general application. Quite to the contrary; as we know industrial housing today, it presents a far different problem than the earlier examples indicate; nevertheless, these statistics record the general history of the movement and are of benefit in searching for the next step.

As regards the general construction of the houses, the frame structure was found to be the most prevalent; brick used about one-tenth as much; other materials less prevalent than brick.

Recommended Minimum Requirements by John Knowls :- From information obtained by a study of the intimate family life in various industrial towns, after consideration of the many practical elements entering into the question, and taking into consideration the express opinion of many qualified authorities, the

author's recommendations as to the minimum requirements of "An Industrial Workers' Home" are as follows :-

1. Materials.- Permanent weather proof construction of exterior walls and roof.
2. Cellar. Cellar to be provided, except in localities where impractical or unnecessary.
3. In case cellar is omitted, first floor to be at least 2 ft. above ground and supported on masonry piers or foundations carried below frost line; and the clear space enclosed but adequately ventilated.
4. Where cellar is provided, it shall have cement floor and floor drain.
5. Cellar to be properly lighted and ventilated.
6. No living quarters to be in basement.
7. A separate chimney flue to be run to the cellar for future installation of a furnace.
8. Adequate provision must be made for heating the house, but furnace should not be minimum requirements. All heating fixtures, whether using gas or other fuel, must be provided with vents to flues.
9. Gas piping to be provided for kitchen range and hot water boiler.
10. Rooms .- One room for parents and infant child and enough rooms for other children for proper segregation of the sexes.
11. Room sizes to accommodate minimum furniture as listed. The furniture to be drawn into scale on plans, so as not to conflict with windows, doors or hot air registers.
12. Row or group houses to be not more than two rooms deep; except in rows where combinations of units (as one 4-room, two 6-room, and one 4-room) allow for proper ventilation to the rooms of the deeper unit by the nature of their arrangement.
13. Duplexes, Double Duplexes, etc.- In all such units, provision shall be made for obtaining as great a degree of privacy as is enjoyed at least in the row type house. Separate front and rear entrances, separate cellars when cellars exist, with independent plumbing lines, and heating and lighting facilities. It is also recommended that means of circulation between each apartment and private cellar be effected without going outside the house.
14. Closets .- Every bedroom must have clothes closet in direct connection with it.
15. Closet or case of adequate size for keeping necessary china, kitchen utensils, staple supplies etc., must be arranged for in kitchen.
16. Entrances.- There must be means of entrance other than by the front door.
17. Front porches, while desirable, are not a minimum requirement.
18. In no case should the stairs have a rise of over 8 inches and tread of less than 9 inches.
19. Ventilation.- There shall be a clear height of not less than 6 ft. 6 in. from cellar floor to under side of first floor joist. A minimum clear story height of 8 ft. shall generally obtain for first and second storey's, but in cases of second storey rooms coming under sloping roofs, it shall be required that flat portions of ceiling be over an area of at least 40 Sq.ft. with  $3\frac{1}{2}$  ft. minimum flat ceiling width and a clear height of 6 ft. over an area of at least 80 Sq.ft. with a minimum width of 7 feet. (Attic rooms not subject to these requirements).
20. There shall be in all cases an air space, with minimum of 8 in. from ceiling to roof, with provision that such space be ventilated directly to outside air.
21. Every bedroom to have at least one window opening directly to outer air.
- 22.

22. One window to be sufficient for single rooms, two windows for double rooms. No room to have less than 12 Sq. ft. of window area.
23. Bathroom to have one window of not less than 6 Sq.ft. area.
24. Water closet compartment to have one window of not less than 4½ Sq.ft. opening directly to outer air.
25. Skylight may be used in lieu of window for bathroom or water closet compartment.
26. Window frames to be of such design that screens may be used.
27. Water Supply.- Running water to be required in connection with kitchen plumbing fixtures. (hot water connection is desirable).
28. A water closet in separate compartment, properly ventilated, must be provided when bathroom is omitted.
29. While bathroom is greatly to be desired, it is not to be a minimum requirement; provided convenient and complete bath house facilities are arranged for and properly maintained for community use.
30. Either laundry trays to be provided in cellar or combination tray and kitchen sink in kitchen.
31. Electricity to be furnished whenever possible. One switch to be provided for throwing on light on entering house and one switch to control cellar light from top of cellar stairs.

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The National Conference of Charities and Correction held at Cleveland (United States) in 1912 formulated its housing standard as follows :--

"The Right to Home. Social welfare demands for every family a safe and sanitary home; healthful surroundings; ample and pure running water inside the house; modern and sanitary toilet conveniences for its exclusive use, located inside the building; adequate sunlight and ventilation, reasonable fire protection; privacy, rooms of sufficient size and number to decently house the members of the family; freedom from dampness; prompt and adequate collection of all waste materials. These fundamental requirements for normal living should be obtained by every family, reasonably accessible from the place of employment at a rental not exceeding 20% of the family income". (Proceedings P.P. 391, 392).

The standard that has been actually achieved in the United States and various countries of Europe is given below in brief :

United States: "Minimum house-four rooms; living room, kitchen, two bedrooms and bath". (The Housing of the Unskilled Wage Earner, E.E. Wood. P.II).

England: "It is now laid down that for a normal working class family there shall be provided a dwelling containing a parlour, kitchen, a scullery, three bedrooms and a bath room in addition to the ordinary conveniences". (Housing Barnes. P.26.)

London Country Council: "There are a few cottage flats of three and four rooms containing scullery and bath; the great majority are cottages of from four to seven rooms and bath. The scullery contains sink, wash tubs..." (Housing Progress in Western Europe, E.Wood, Page. 63.

Housing Act 1924:

The act provides that "it shall be the duty of a Local Authority on submitting proposals to satisfy the Minister, that the rate of density of the houses will not, except with the consent of the minister exceed eight per acre in an agricultural area & twelve per acre elsewhere".

- Holland: Amsterdam. Five rooms, sewer connected toilets, running water and electric lights.
- Belgium : Twelve dwellings to an acre, space in front for flowers and in the rear for vegetables. Antwerp Five rooms .
- France: Paris. Four rooms is the most frequent type.
- Italy : Rome. Many apartments have three rooms and a few are larger.
- Germany. Large airy and well lighted apartments of two or three rooms.

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Government of Bombay had called for prize designs to meet the requirements of working class people which resulted in a first prize design being for 5 tenancy group house, single storied giving a net floor area of 260 Sq.ft. for each tenancy costing Rs. 1143/- for tile roof covering. There was an additional area for two sanitary annexes of 60 Sq.ft. each provided for the common use of 5 tenancies. This design was not however issued to the public as a standard type to be adopted but was recommendatory.

The floor area of 260 Sq.ft. was made up of two rooms each of 100 Sq.ft. one kitchen 25 Sq.ft. and a verandah 35 Sq.ft. Such design was calculated to provide for 38 tenants to the acre. Taking 5 persons per tenants this gives a density of 190 persons per acre. This design, though then considered to be the finest, was suggested to be useful for people a little better off than the working class people.

The standard of over crowding according to the City of Bombay Municipal Act, 1688, Section 379-A(4) in as follows:-

" A room used exclusively as a dwelling shall be deemed to be overcrowded..... when the number of the adult inmates is such that the amount of floor space available for each adult inmate is less than 25 superficial feet and for each person under the age of 10 years less than 12½ superficial feet, or when the air space for each adult inmate is less than 250 cubic feet, two children under 10 years of age counting as one adult. "

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The standard of overcrowding according to the Building Act, 1936, of England, Section 58, is as under :--

- (1) A dwelling-house shall be deemed for the purposes of this Act to be overcrowded at any time when the number of persons sleeping in the house either-
- (a) is such that any two of those persons, being persons 10 years old or more of opposite sexes and not being persons living together as husband and wife, must sleep in the same room;
  - (b) is in relation to the number and floor area of the rooms of which the house consists, in excess of the permitted number of persons, as defined in the 5th Schedule to this Act.
- (2) In determining for the purpose of this Section the number of persons sleeping in a house, no account shall be taken of a child under one year old, and a child who has attained one year and is under 10 years old shall be reckoned as one - half of a unit.

Fifth Schedule.

..... The expression "The permitted number of persons" means, in relation to any dwelling-house, either---

(a) the number specified in the second column of Table I in the annex hereto in relation to a house consisting of the number of rooms of which that house consists,

or

(b) the aggregate for all the rooms in the house obtained by reckoning, for each room therein of the floor area specified in the first column of Table II in the annex hereto, the number specified in the second column of that Table Provided that in computing for the purposes of the said Table I the number of rooms in a house, no regard shall be had to any room having a floor area of less than 50 square feet,

Table I.

When a house consists of:-

(a) one room	..	2	
(b) two rooms	..	3	
(c) three rooms	..	5	
(d) four rooms	..	7 $\frac{1}{2}$	
(e) five rooms or more	..	10	with an additional 2 in respect of each room in excess of five.

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Table II.

Where the floor area of a room is:-

(a) 110 square feet or more	..	2
(b) 90 sq.ft. or more, but less than 110 sq.ft.	..	1 $\frac{1}{2}$
(c) 70 sq.ft. or more, but less than 90 sq.ft.		1
(d) 50 sq.ft. or more, but less than 70 sq. ft.		$\frac{1}{2}$
(e) Under 50 sq.ft.	..	Nil.

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STANDARDS!

(Rural: foreign countries)

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Belgium:- The plans supplied comprise;

In the basement : Cellar and dairy.

On the ground floor : Two rooms (kitchen-living-room and a bed room) and an entrance hall from which staircases lead to the upper floor and cellar.

On the upper floor : two attic bedrooms and third bedroom with bathroom. A corridor separates the bedrooms and leads directly to the bathroom.

The bedrooms are of good size

The plans of the Societe nationale de la petite propriete terrienne also comprise a scullery-washroom on the ground floor.



France .- Householders are recommended to improve rural houses having only a ground floor surmounted by a loft, by building an upper floor in place of the loft and fitting bed-rooms there. If the height of the loft allows, attic bedrooms can be fitted up in it.

Householders are also recommended to instal a separate scullery communicating with the kitchen and to have a minimum of three bedrooms (parents, girls, boys) the common kitchen living-room being able to take a bed at need. A covered porch or a hall, or both, is highly recommended.

Latvia .- The houses in the most modern farms have :

On the ground floor: Porch, hall, kitchen with bread-oven and separate scullery, two bedrooms with stove, and staircase leading to the upper floor;

On the upper floor: Two bedrooms.

Another type intended for the agrarian reform settlements has a kitchen with bathroom.

Some agricultural labourers' houses have only the ground floor surmounted by a loft, and comprising two bedrooms and a kitchen.

Netherlands .- The latest types of houses on the older most recently built over, comprise;

On the ground floor : Hall, Kitchen-living-room with separate scullery two bedrooms, staircase to upper floor.

On the upper floor: Two bedrooms & a small loft.

The labourers' lodgings (generally two in each labourer's house) comprise :

On the ground floor : Hall, kitchen-living-room with separate scullery, the living-room being available for sleeping if necessary.

On the first floor: Two or three bedrooms.

In communes with less than 10,000 inhabitants, the proportion of house with three or more habitable rooms was 36% in 1899, 45% in 1909, and 71% in 1930.

Poland .- The old-style rural houses usually consist of the ground floor surmounted by a loft. The smallest new type comprises the ground floor and one or two bedrooms on the upper floor.

In houses in the agrarian reform settlements, it is proposed to add a bathroom to the present type.

Sweden .- The standard plans of houses for agricultural and forest workers and small holders comprises:

Basement : Concrete cellar (wash-room, dairy, provision store-room).

Ground floor: Porch, hall, kitchen-living-room (with alcove for small children), one or two bedrooms, staircase to upper floor.

Upper floor : One attic bedroom and a loft in which another bedroom could be fitted up if necessary.

The collective agreements between employers and agricultural labourers stipulate that the lodgings of the latter shall include two rooms and a kitchen, a clothes-closet and a store-room.

It has been observed that rural workers retain the -

habit of sleeping many people in the same room in order to keep a separate parlour.

An investigation in 1936 showed that rural lodgings comprising a kitchen and one bedroom represent a third of the whole, while those containing a kitchen and two bedrooms amount to hardly three-fifths. The kitchens are generally used for sleeping, and one of the rooms, if there are several, or if not, the only room, is kept as a parlour ("bestroom").

Czecho-Slovakia:- " common type of houses has ground floor and loft, with kitchen, living room (benches along the walls), three bedrooms containing several beds, and a wash-room with bath. The staircase to the loft is in the hall.

The ground floor is sometimes built over a cellar, & there is a verandah porch in front of the house. In many cases there are only two bedrooms.

Agricultural labourer's houses containing several lodgings usually comprise a kitchen with larder and one bedroom; on the upper floor there is a loft without bedroom.

Yugoslavia:- Rural houses properly so-called usually comprise a hall, a kitchen-living-room with larder, and two, or sometimes three, bedrooms; on the upper floor is a loft. The inhabitants frequently gather in one room during the winter.

Around Zagreb, the ground floor is occupied by the wine cellar and the provision store-room; on the upper floor which is reached by a staircase leading to a balcony surrounding the house there is a hall, two bedrooms and a kitchen, from which a stair-case leads to the loft.

A recent standard type, built according to the plans of a provincial institute of hygiene, comprises ground floor with hall, kitchen, four bedrooms, lavatory and larder. The cellar is used for wine-making, and is reached directly from outside.

When there is an upper floor, it contains a bedroom and a loft.

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Belgium .- The general type of building for a small holding with outbuildings under the same roof as the living quarters measures 115 - 165 square metres. Such a building is only provided when the small holder has from 3 to 10 hectares (according to the fertility of the soil) of ground.

France :- The minimum dimensions are laid down in the Departmental Sanitary Regulations issued in pursuance of the law of February 15th, 1909, on the Protection of Public Health, and in the administrative regulations accompanying the Law of August 31, 1929, on the Improving of the Housing of Agricultural Labourers. The minimum floor-surface of a living room is 9 square metres and the minimum height from floor to ceiling 2.70 metres. On the top floor (attic loft) the 9 Sq. metres floor-surface is measured at 1.30 metre from the ground and the cubic content of the room must not be less than 22 cubic metres.

Latvia:- The minimum height 2.3 metres; it is, however recommended to allow from 2.6 metres to 2.8 metres, though 2.3 metres is admissible for the top story.

In the labourer's cottages, the floor-space, kitchen included, must be from 40 to 50 square metres for one family, from 50 to 80 square metres for two families and more than 80 square metres for three families.

In recently erected buildings, heights of 2.70 metres on the ground and 2.30 metres on the first floor are met with.

Netherlands :- The minimum dimensions are laid down by the Housing Law (Wooningwet) of June 2nd, 1901.

Rooms seem to range from 2.70 metres to 2.80 metres in height; the living rooms are fairly big, but the bedrooms seem small (in some cases, 5 to 8 square metres).

Poland :- The regulations for cheap housing may be applied to rural housing. The standard plans supplied to peasants usually allow for rooms 2.80 metres high on the ground floor, and 2.40 metres high on the first floor. The rooms are large.

Sweden :- As already stated, collective agreements between agricultural employers and labourers fix the minimum area of a family dwelling at 35 square metres excluding the hall & storeroom.

Investigations made in Sweden show that half the living rooms in dwellings with two rooms and kitchen have not as much as 15.2 square metres floor space, and the kitchens 15.5 square metres, and that the average area of dwellings of one room and kitchen is 36.2 square metres, and of dwellings with two rooms and kitchen 50 square metres; that only 10% of dwellings with two rooms and kitchen are more than 2.70 metres high; that a good 20% are less than 2.10 metres high; that more than 25% of the people occupying small dwellings have less than 10 cubic metres of air-space per person; and that almost half the members of families with three children or more under 15 years of age do not even enjoy this minimum of air-space in their bedrooms (overcrowding).

The standard plans provided for rooms 2.40 metres high on the ground floor and 2.20 metres high on the upper floor; the kitchen-living-rooms are rather large, as they have separate sculleries and pantries; bedrooms are about 12 square metres, but have cupboards extra; some have an area of from 20 to 25 square metres, but these are often partitioned.

APPENDIX 2.

DWELLINGS FOR AGRICULTURAL WORKERS IN GERMANY.

The living-area of the dwellings is not to be less than 50 Sq.m. and for large families the minimum is 55 Sq.m. In most of the buildings already constructed these figures have been exceeded. The ground-floor usually contains a combined kitchen and living-room, a bedroom for the parents and a small bedroom for the children, as well as entrance hall and pantry. There must be a cellar under one of the rooms for storing potatoes and other field-produce. Under the roof a chamber is constructed, and a further one can be added later on. For workrooms roughly 30 Sq.m. are available in the small-holdings and own-homes, and 15 Sq.m. in the works-dwellings. It is also desirable to have a fodder-kitchen and this is provided in almost every case. The outhouses for livestock have a coverage of from 10 to 20 Sq.m. They contain a stall for cows and a pigsty. In the case of own-homes for grape-gatherers or wood-men in decidedly mountainous districts not cultivating any land on their own account, the work-rooms can well be restricted in size. Similar exceptions are also made for agricultural craftsmen if they provide a workshop in which to pursue their trade.

Different types of building are adopted in keeping with the traditions of the different parts of the country, It is, however, a general rule that single houses shall be built, i.e., no multi-family houses. As an exception double-houses are permitted where a farmer or agriculturist needs two dwellings for his employees. In such cases the families are to be separated from each other if at all possible.

APPENDIX 3a. Taxation .

Calculation of income @ 1% ad velorum excise on the total output of industries where labour is to be housed by the State.

The total disbursement for labour per year in Bombay Mills alone comes to about .. .. . year.  
 .. .. . Rs. 4.5 x 12 = 54 millions/

The total disbursement for labour per year by all concerned including mill in Bombay may be assumed .. .. Rs. 80 millions/ year.

Therefore :

The total disbursement for labour by all concerned in the whole of Bombay Presidency may be assumed.. .. Rs. 80 x 2 = 160 millions/ year.

The total disbursement for labour by all concerned in the whole of India: assumed; 5 times that of B'bay Presi. .. Rs. 5 x 160 = 800 millions year.

Value of the total output of all industries assumed to be 5 times that of total disbursement for labour in the whole of India. .. Rs. 5 x 800 = 4000 millions/ year.

Therefore: Excise @ 1% Ad velorem = Rs.  $\frac{4000}{100}$  = 40 millions/year.

APPENDIX 3b.

TABLE SHOWING INCOME, OUT-GOINGS, BALANCE AND RESULTING RATE OF INTEREST, FOR HOUSING PROGRAMME BY THE STATE .

Assumption :

1. Rs. 1250 as average cost of a unit tenement, all inclusive, having building for Rs. 1,000 and land for Rs. 250
2. Rs. 6/- to be the rent per month per unit tenement on the basis of 10% of the family income as assumed to be increased to Rs. 60/- per month from the present one of Rs. 40/- per month under national Plan.
3. Alternatively rent of Rs. 4/- per month per unit tenement on the basis of 10% of Rs. 40/- per month as the family income in industrial centres assumed to be static inspite of national planned economy.

Item no.	Description.	Rent per month Rs.6/-	Rent per month Rs.4/-
I.	Income from rent 12 x ..	72	48
-----			
2. Out goings:-			
(a)	Sinking fund. 88% (3% - 50 years life) on Rs. 1,000 capital per unit tenement. ..	8.8	8.8
(b)	Insurance 3/ 16% on 9/10 Cost: $3/16 \times 1/100 \times 9/10 \times 1000 = 1.7$		1.7
(c)	Administration: Maintenance & Collection etc.9. 1% on 9/10 the cost $1 \times 12/100 \times 9/10 \times 1000$		9.
(d)	Rates and Taxes :- 12% on income (I) $72 \times 12/100 = 48 \times 100$ ..	8.64	5.76
(e)	Vacancies, defaults, etc. 5% on income $72 \times 5/100 = 48 \times 5/100$ ..	3.6	2.4
		<u>31.74</u>	<u>27.66</u>
-----			
	Net income : return on capital of Rs. 1250 ..	.. 40.26	20.34
-----			
	Therefore: Rate of interest ..	3.20	1.60
-----			

Note : If Rs. 4/- per month is assumed to be the final chargeable rent and the deficiency is decided upon to be made up by 1% excise to be distributed over 2.5 millions tenements to be constructed in the first 10 years instead of the total requirements of 10 million tenements, the income per tenement will increase by  $40/2.5 = \text{Rs. } 16$  per tenement. Therefore Net return will  $20.34 + 16 = \text{Rs. } 36.34$  yielding  $\frac{36.34}{1250} \times 100 = 2.8\%$

APPENDIX 4.

List of materials and their products used in construction works.

- Blasting materials :- Gunpowder; Cartridges; Fuses; Detonators; Dynamite; Electrical Detonators; Blasting tools.
- Asbestos :- Roofing sheets; Coiling and partition sheets; Rain-water pipes and gutters; Soil pipes; Water pipes; Rubber rings for joints; Fire-proofing.
- Brushes :- Bristle and wire brushes (floor, road, plaster); Oil painting; Colour and white washing; Sable hairbrushes (painter's); Manufacture of bristles & fibres; Brooms.
- Asphalt :- Roads - Base and surfacing; roof-paint; Water-proofing sheets; materials and compounds; preservative; paint; mastic; damp-proof; construction; asphaltic cement; asphaltic lining.
- Tar :- Road; paint and preservative.
- Bricks :- Ordinary brick, fire-brick; salt-glazed bricks; yellow bricks; facing bricks; engineering bricks; hollow bricks; hollow flooring bricks; sand-lime bricks.
- Cement :- Ordinary cement; rapid hardening cement; quick setting cement; cement forru, block or aluminous cement; coloured cements.
- Cement Products :- Cement blocks; hollow blocks; slabs; tiles; garden decorations jalli works; house decorations poles; pipes .
- Tiles :- Cement, marble; glazed; unglazed; stone slabs; clay-channels.
- Roofing tiles :- Flat mangalore tiles; half-round; flat channelled (clay and cement) slate.
- Chemicals :- Aluminium (water treatment, preservative, washes), copper sulphate (colour-washing); caustic soda (cleansing); sodium silicate (water-proofing); bleaching powder (water-treatment); chlorine liquid (water-treatment) Amonia (water-treatment), sulphur (wall-washing).
- Paints & Varnishes :- Base, Vehicle, pigment, drier, ready mixed and dry, proprietary brands, paint removers, varnishes, wax.
- Tower Clocks :-
- Stoneware :- Salt-glazed - pipes, special and accessories, sanitary fittings (latrine seat, soil pan, wash basin, sinks, Public urinal). Vitreous - sanitary fittings (soil pan, wash basin, bidet, urinal).
- Electro-plated-ware: See Hardware and Plumbing.
- Glass :- Sheet, crown, plate wire glass, figured, fluted, ribbed, knobs and handles, mirror glass (cupboard), vitrolite.
- Furniture :-
- Glue :- Joinery, drawing, colour washing.

Iron and iron products :- Rolled steel - round, square and hexagonal, twisted bars, flats-equal and unequal angles, tees, Z.I. channel sections, rails, high tensile steel, wire coils, plates, sheets, galvanized (plain and corrugated), tinned-sheets, wire ropes (black and galvanized) wire fencing (barbed simple, woven), expanded metal, wire net, wire gauze, perforated sheets; bolts, nuts) screws; nails; rivets, hooks; washers; steel pipe (welded, riveted, etc); pressed sheets (tank, ceiling, partition, cornices, etc. and fencing); brackets, buckets, cast steel, tool steel, wrought iron pipes (black and galvanized); specials and accessories, drawn tubes; Mannasman poles (telegraph and telephone); telescopic poles etc.

Tools :- Ghamelas, Phawrahs, shovels, pickaxe, crowbars; hammers; axe, chisels, and other mason's and carpenter's tools, files.

Castings :- Pipes, specials, accessories (rain, water, drain, flushing, soil, gas, steam) sewage fittings railings posts.

Building Hardware :- hinges, stoppers, adldrops, hasp-clasp, hooks, pegs, brackets (sheff), door locks, oxidised fittings, plated fittings, clips.

Instruments and apparatus :- Drawing - compasses, pens, dividers (simple and proportional); straight edge, spring bows, stencils, steel scale and wooden and ivory scales, set-squares (wood, celluloid, ebonite, steel), protractor (steel) celluloid, ivory brass) semi-circular, circular and rectangular; pentagraph, edigraph, french and railway curves (wood, celluloid) flexible curves (rubber, steel); plannimeter.

Survey - Steel chains, steel tapes, mettalic tapes, flexible tapes, steel bends, instruments (levelling various types); theodolites, optical square, cross-staf plane table, compass, ghat-tracers, barometric level, binoculars, levelling stanes.

General - slide rules, flow measures, cardboard scales, strength-testing machines- steel, cement; timber sieves, pressure gauges, Deflection-metres.

Drawing materials - thick paper, mounted paper, (scales and jointed), ferro-prussiate (cloth and non-cloth) ferro-gallic (cloth and non-cloth) Amonia paper, pencils, coloured pencils, inks, correct colours (tubes, cakes, pens), brusehes; stickings, squared paper (rolls and sheets); tracing paper and cloth erasers (ink and pencil).

Electrical fittings :- wires, switches, bells, shades, bulbs, plugs, brackets, water-tight fittings, fans, domestic appliances, lighting conductors.

Plants :- rollers (steam and oil, bullock, hand); concrete mixers, mortar mills, pumps (centrifugal), pottary) diaphragm); stonecrusher, cranes, barrows, chain pulley block, pulley sheaves, vibrators, asphalt heaters, asphalt sprayers, paint-sprayer, sand-washers, pile-drivers, dreadger, block making machine, crab-winch, ejectors, fire engine, fire-extinguishers.

Tools :- Pickaxe, crowbar, hammer, axe, sledge, hammer, chisel, chamelah, pawrahs, shovel, mason's level, carpenter's tools, spatula, mason's tools, smith's tools.

Brassware :- hinges, adldrop, stopper, handles, knobs, hooks, and eye, hasp and clasp, door-lock, rings, brackets, pegs, tubes, bars, wire gauze.

Water fittings :- sluice valves, stop-cocks, bib-cocks (electro-plated, chromium-plated and unplated); Air valve, hydrants, stand posts, ferrules, ball valve, reflux valve, venturimeter, water meter.

Alluminium railings, lead-sheets, pig lead, lead wool-

zinc sheet, perforated zinc sheet.

Lime :- quick lime, hydraulic lime, water-proofing.

Water works plant :- chemical measurers and mixers, filtration fittings, flow control, discharge measurers, pressure filters, air apparatus, chloronom and chlorine apparatus, water softener.

Pipes :- cast iron, wrought iron (black and galvanized); steel; spun-iron, mild steel, asbestos, glazed stoneware, rustless, corrugated, rivetted, lead copper.

Timber :- plywood, pressed wood bentwood.

Sewage disposal plants :-

Scientific articles and plant :- air conditioning; insulation boards, fire extinguishers, domestic filters, wall boards, ceilings, fiber ceilings (gypsum, cork, fibre).

Decorative articles :- Statues, fountains, vases.

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APPENDIX 5a.

I. Vital Articles .

Blasting materials :- Gunpowder, cartridges, fuses, detonators, dynamite, electrical detonators.

Chemicals :- Aluminium compounds (water treatment), preservative, washes), caustic soda (cleansing), bleaching powder (water treatment), chlorine liquid (water treatment), sulphur.

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APPENDIX 5b.

II. Articles for self-sufficiency.

Blasting materials :- Gunpowder, cartridges, fuses, detonators, dynamite, electrical detonators, blasting tools.

Asbestos products :- Roofing sheets, ceiling and partition sheets, rainwater pipes and gutters, soil pipes, water pipes, rubber rings for joints, fire-proofing, lagging.

Brushes :- Bristle and wire brushes (floor, road, plaster) oil painting, colour and white washing, sable hair brushes (painters' Manufacture of bristles & fibres, brooms.

Bitumen :-

Asphalt products :- Base and surfacing (roads), roof-paint, water proofing sheets, materials and compounds, preservative, paint, mastic, damp-proof construction, asphaltic cement and lining.

Chemicals :- aluminium compounds (water treatment, preservative, washes), copper sulphate (colour washing); caustic soda (cleansing); sodium silicate (water-proofing), bleaching powder, chlorine liquid and ammonia (water treatment); sulphur.

Paints and varnishes :- Base, vehicle, pigment, drier, dry and ready mixed paints, paint removers, varnishes, wax.

Tower clocks :-



Stoneware vitreous materials :- Sanitary fittings (soil-pan, wash basin, bidet, urinal).

Electro-plated ware :-

Glass :- sheet, crown, plate, wire glass, figured, fluted, ribbed knobs, and handles, mirror glass, vitrolite.

Iron and iron products :- Rolled steel; round, square and hexagonal, twisted bars, flats, equal and unequal angles, tees Z.I, channel sections, rails, high tensile steel, wire coils, plates, sheets-galvanized (plain and corrugated), tinnet sheets, wire ropes (black and galvanized), wire fencing (barbed simple, woven), expanded metal, wire net, wire gauze, perforated sheets.

Tools :- Chandelas, phawrahs, shovels, pickaxe, crowbars, hammers axe, chisels, files and other mason's & carpenter's tools.

Building hardware :- hinges, stoppers, alldrops, hasp-clasp, hooks, pegs, brackets, (shell), door-locks, oxidised fittings, plated fittings, clips.

Instruments and apparatus :-

Drawing : Compasses, pens, dividers (simple and proportional), straight edge, spring bows, stencils, steel scales, wooden and ivory scales, set-squares (wood, celluloid, ebonite, steel), protractor (steel, celluloid, ivory, brass), semi-circular, Circular and rectangular; pentagraph, edigraph, french and railway curves (wood & celluloid), flexible curves (rubber and steel), planimeter.

Survey :-

Steel chains, steel tapes, metallic tapes, flexible tapes, steel bands, instruments (levelling various types), theodolites, optical square, cross staff, plane table, compass ghat-tracers, barometric level, binoculars, levelling staves.

General :-

Slide rules, flow measures, cardboard, scales, strength-testing machines-steel, cement, timber, sieves, pressure gauges, deflection metres.

Drawing Materials :-

Thick paper, mounted paper (seamless and jointed), ferro-prussiate (cloth and non-cloth), ferro-gallic (cloth and non-cloth), ammonia paper, pencils, coloured pencils, inks, correctors, colours (tubes, cakes, pens), brushes, stickings, squared paper (rolls and sheets), tracing paper and cloth, erasprs (ink and pencil).

Electrical fittings :-

Wires, switches, bells, shades, bulbs, plugs, brackets, water-tight-fittings, fans, domestic appliances, lightning conductors.

Plant :-

Rollers (steam and oil, bullock, hand,) concrete mixers, mortar mills, pumps (centrifugal rotary, diaphragm), stone crusher, cranes, barrows, chain pulley sheaves, vibrators, asphalt heaters, asphalt sprayers, paint sprayer, sand-washers, pile-drivers, dredger, block-making machines, crabwinch, ejectors, fire-engines, fire-extinguishers.

Water fittings :-

sluice valves, stop-cocks, bib-cocks  
electroplated chromium-plated and unplated);  
air-valves, hydrants, standposts, ferrules,  
ball-valves, reflux valves, venturimeter,  
water meters.

Water works appliances :-

Lead and Zinc :-

lead sheets, pig lead, lead wool, zinc sheet,  
perforated zinc sheet.

Water works plant:-

Chemical measures and mixers, filtration  
fittings, flow control, discharge measures,  
pressure filters, air apparatus, chloronome  
and chlorine apparatus, water softener.

Pipes :-

Cast iron, wrought iron (black and galvanized,  
steel, spun-iron, mild steel, asbestos, glazed  
stoneware, rustless, corrugated, rivetted,  
lead, copper.

Wood products :-

Ply wood, pressed wood, bentwood.

Sewage disposal Plant :-

Scientific articles and plant :-

Air conditioning insulation boards, fire  
extinguishers, domestic filters, wall-boards,  
ceilings, fiber ceilings (gypsum cork, fibre).

Lifts :-

Fire-fighting appliances :-

Rubber products :-

III. Easily developed articles

- Asbestos Products -- Roofing sheets, ceiling and partition sheets, rain water pipes and gutters, soil pipes, water pipes, fire-proofing, lagging.
- Brushes -- Bristles and wire brushes, oil painting, colour and white washing, sable hair brushes, manufacture of bristles and fibres, brooms.
- Tar -- Road, painting and preservative.
- Bricks -- Ordinary brick, fire brick, salt-glazed, yellow, and facing bricks, engineering bricks, hollow bricks, flooring bricks and sand-line bricks.
- Cement -- Ordinary cement, rapid hardening cement, quick-setting cement, cement fondu, black or aluminous cement, coloured cement.
- Cement products -- Cement blocks, hollow blocks, slabs, tiles, garden decorations, jalli works.
- Tiles -- Cement, marble, glazed, unglazed, stone slabs, clay channels.
- Roofing tiles -- Flat Mangalore tiles, half-round, flat-channelled, slate.
- Chemicals -- Caustic soda.
- Paints & varnishes - Base, vehicle, pigment, drier, ready-mixed and dry, proprietary brands, paint, removers, varnishes and wax.
- Stoneware -- Salt-glazed pipes, specials and accessories, sanitary fittings (latrine seat, soil pan, wash basin, sinks, public urinal), vitreous, sanitary fittings (soil pan, wash basin, bidet, urinal).
- Electro-plated ware -
- Glass -- Sheet, crown, plate, wire-glass, figured, fluted, ribbed, knobs and handles, mirror glass, vitriolite.
- Glue -- Joinery, drawing, colour washing.
- Iron & iron products--Rolled steel (round, square, hexagonal, twisted bars); flats, equal and unequal angles, tees Z, I, channel sections, rails, high tensile ~~xxxxxx~~ steel, wire coils, plates, sheets, galvanised (plain and corrugated), tinned sheets, wire ropes (black and galvanised), wire fencing (barbed, simple, woven), expanded metal, wire net, wire gauze, perforated sheets, iron products, bolts, nuts, screws, nails, rivets, hooks, washers, steel pipes, pressed sheets, brackets, buckets, cast steel, tool steel, wrought iron pipes, specials and accessories, drawn tubes, Mannarsman poles, telescopic

	poles, tower rails, bath rails.
Tools --	Ghamelas, phawrahs, shovels, pickaxe, crowbars, hammers, axe, chisels, files, masons' and carpenters' tools.
Castings --	Pipes, specials, accessories, sewage fittings, railings, posts.
Building hardware -	Hinges, stoppers, alldrops, hasp-clasp, hooks, pegs, brackets (shelf), door-locks, oxidised fittings, plated fittings, clips.
Electrical fittings-	Wires, switches, bells, shades, bulbs, plugs, brackets, water-tight fittings, fans, domestic appliances, lightning conductors.
Brassware -	Hinges, alldrop, stopper, handles, knobs, hook and eye, hasp-clasp, door-locks, rings, brackets, pegs, tubes, bars, wire-gauze.
Water fittings -	Sluice valves, stop-cocks, bib-cocks, air valve, hydrants, stand posts, ferrules, ball valve, reflux valve, venturimeter, water meter.
Lime -	Quick lime, hydraulic lime, water-proofing.
Pipes -	Cast iron, wrought iron (black and galvanised) steel, spun Hume, Hume-steel, asbestos, glazed, unglazed, stoneware, rustless, corrugated, rivetted, lead and copper.
Wood products -	Plywood, pressed wood, bent wood.

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IV. Factory scale articles-

Asbestos products --	Roofing sheets, ceiling, and partition sheets, rain water pipes and gutters, soil pipes, water pipes, rubber rings for joints, fire -proofing, lagging.
Brushes --	Bristle and wire brushes (floor, road, plaster), oil painting, colour and white washing, sable hair brushes (painters'), manufacture of bristles and fibres, brooms.
Ashphalt products -	Roads - base and surfacing, roof paint, water proofing sheet, mastic, damp-proof construction, materials and compounds, preservative, paint, asphaltic cement, asphaltic lining.
Tar --	Road paint and preservative.
Bricks --	Fire-bricks, salt-glazed, bricks, yellow bricks, facing bricks, engineering bricks, hollow bricks, hollow flooring bricks, sand-lime bricks.
Cement products --	Cement blocks, hollow blocks, slabs, tiles, garden decorations, jalli works, house decorations, poles.
Tiles --	Cement, marble, glazed, unglazed, clay-channels.
Roofing tiles --	Flat Mangalore tiles, flat channelled (clay and cement).
Chemicals --	Copper sulphate, sodium silicate, ammonia.
Paints & varnishes --	Base, vehicle, pigment, drier, dry and ready mixed, proprietary brands, paint removers, varnishes wax.
Tower clocks --	
Vitreous stoneware materials --	Sanitary fittings (soil pan, wash basin, bidet, urinal).
Electroplated ware -	
Glass --	Sheet, crown, plate, wire glass, figured, fluted, ribbed, knobs and handles, mirror glass, vitriolite.
Furniture --	
Iron products --	Bolts, nuts, screws, nails, rivets, hooks, washers, pressed sheets (tank, ceiling, partition, cornices etc. and fencing), brackets, buckets, towel rails, bath rails.
Tools --	Chamelas, phawrehs, shovels, pickaxe, crowbars, hammers, axe, chisels, files, masons' and carpenters' tools.
Castings --	Railings and posts.

- Building hardware -- Hinges, stoppers, alldrops, hasp-clasp hooks, pegs, brackets (shelf), door-locks, oxidised fittings, plated fittings, clips.
- Instruments and apparatus .
- Drawing --- Compasses, pens, dividers (simple and proportional), straight edge, spring bows, stencils, steel, wood and ivory scales, set-squares (wood, celluloid, ebonite, steel), protractor (steel, celluloid, ivory, brass), semi-circular, circular and rectangular; pentagraphs, ediograph, French and railway curves (wood and celluloid), flexible curves (rubber, steel), planimeter.
- Survey -- Steel chains, steel tapes, metallic tapes, flexible tapes, steel bends, instruments (levelling - various types), theodolites, optical square, cross-staff, plane table, compass, ghat-tracers, barometric level, binoculars, levelling-staves.
- General -- Slide rules, flow measurers, cardboard scales, strength-testing machines - steel, cement, timber, sieves, pressure gauges, deflection meters.
- Drawing materials -- Thick paper, mounted paper (seamless and jointed), ferro-prussiate (cloth and non-cloth), ferro-galic (cloth and non-cloth), ammonia paper, pencils, coloured pencils, inks, correctors, colours (tubes, cakes, pens), brushes, stickings, squared paper (rolls and sheets), tracing paper and cloth, erasers (ink and pencil)
- Electrical fittings - Switches, bells, shades, bulbs, plugs, brackets, water-tight fittings, fans, domestic appliances, lightning conductors.
- Plant -- Concrete mixers, pumps, stone-crushers, cranes, barrows, chain pulley blocks, pulley sheaves, vibrators, asphalt heaters, asphalt sprayers, paint sprayers, sand washers, pile-drivers, dredger, block-making machines, crab-winch.
- Brassware -- Hinges, alldrop, stopper, handles, knobs, hook and eye, hasp and clasp, door-lock, rings, brackets, pegs, tubes, bars, wire gauze.
- Water fittings -- Sluice valves, stop-cocks, bib-cocks, air-valves, hydrants, stand posts, ferrules, ball valves, reflux valves, venturimeter, water meters.
- Water works appliances:
- Metal work -- Aluminium railings, lead sheets, pig lead, lead wool, zinc sheet, perforated zinc sheet.

Water works plant -- Chemical measurers and mixers, filtration fittings, flow control, discharge measure, pressure filters, air apparatus, chloronome and chlorine apparatus, water softener.

Wood products -- Ply wood, pressed wood, bent wood.

Scientific articles & plant -- Air conditioning, insulation boards, fire extinguishers, domestic filters, wall boards, ceilings, fiber ceilings (gypsum, cork, fibre).

Lifts:

Fire-fighting appliances:

Rubber products:

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Appendix 5 c Mass scale articles

Bitumen:

Bricks -- Ordinary, facing bricks, hollow bricks.

Tiles -- Stone, slabs.

Roofing tiles -- Flat Mangalore tiles, flat-channelled (clay and cement), slate.

Lime -- Quick-lime, hydraulic lime, water-proofing.

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APPENDIX 5 (f)

- 64 - VI. Nationalizable Industries.

Cement:- ordinary cement, rapid hardening cement, quick-setting cement, cement fondu, black or aluminous cement, coloured cements.

Cement products:- poles and pipes.

Stoneware materials:- salt glazed pipes, specials, and accessories, sanitary fittings (latrine seat, soil pan, wash basin, sinks, public urinal).

Iron and iron products:- Rolled steel (round, square, hexagonal, twisted bars; flats, equal and unequal angles, tees, Z, I and channel sections; rails), high tensile steel, wire coils, plates, sheets-galvanized, and black, plain and corrugated, tinned sheets, wire ropes (black and galvanized) wire fencing (barbed, simple, woven), expanded metal, wire net, wire gauze, perforated sheets, steel pipes, cast steel, tool steel, wrought iron pipe (black and galvanized,) pipe specials and accessories, drawn tubes, manasman poles (telegraph and telephone) telescopic poles, etc.

Castings:- pipes, specials, accessories (rain, water, drain, flushing, soil), sewage fittings.

Electrical goods:- wires.

Plant:- Rollers (steam and oil, bullock, hand), pumps (centrifugal, rotary, diaphragm), ejectors, fire-engines, fire-extinguishers.

Pipes:- Cast-iron, wrought iron (black and galvanized), steel, spun-hume, hume steel, asbestos, glazed stoneware, rustless, carrugated, rivetted, lead, copper.

Timber:

Sewage disposal plants:-

Mineral oil products:-

APPENDIX 5 (g)

VII. Tools & Plant.

Blasting tools:-

Tools:- Ghamelas, phawaraks, shovels, pickaxe, crowbars, hammers, axe, files, chisels, masons' and carpenters' tools.

Plant:- Rollers (steam and oil, bullock, hand), concrete mixers, mortar mills, pumps (centrifugal, rotary, diaphragm), stone crusher, cranes, barrows, chain-pulley block, pulley sheaves, vibrators, asphalt heaters, asphalt sprayers, paint-sprayer, sand-washers, pile-drivers, dreuger, block-making machine, crab-winch, ejectors, fire-engine, fire-extinguishers.

APPENDIX 5 (h)

VIII. Cottage-Industry Scale Articles.

Brushes:- Bristle and wire brushes (floor, road, plaster), oil painting, colour and white washing, sable hair brushes (painters'), manufacture of bristles and fibres, brooms.

Roofing tiles:- half round tiles.

Paints and varnishes:- Pigment, wax, ready mixed paints, varnishes.



Electro-plated ware:-

Furniture:-

Glue:- joinery, drawing, colour-washing.

Drawing materials:- Thick paper, mounted paper.

Brassware:- hinges, aldrop, stopper, handles, knobs, hock and eye, hasp and clasp, door-lock, rings, brackets, pegs, tubes, bars, wire-gauze.

Water fittings:- Stop-cocks, bib-cocks, ferrules.

APPENDIX 6.

Analysis of Housing Cost.

It has been found that for the residential areas the proportions of site to the house and over-all cost is on the average 1 to 4 and 1 to 5 respectively. The site cost is distributed on the average among various items of development as follows:- 40% roads; 15% Water-supply; 30% drainage, both storm and sewerage, 15% Land and sundries. The greater portion of development cost will be represented by direct payments for labour engaged in excavation, quarrying etc. Because road cost will almost wholly be spent in quarrying and labour work. Similarly half the amount of storm drainage will be spent in such types of works as quarrying. It is only in sewage and water pipes that the greater portion of the cost is spent in materials. Thus half the cost of development is spent on quarrying and labour and half on materials which can be manufactured on factory scale. Similarly the money spent on the house is distributed as under:- 40% walling; 6% paving; 10% flooring; 20% wood work; 12% roofing, 12% finishings and sundries. The greater part of the house cost will be spent on brick or stone, timber and roofing tiles; and some part on lime and cement. The part of the cost spent on materials, that can be manufactured on factory scale will differ with the design and may thus vary between 30% to 60% or even more. If the average is taken at the lower figure, the factory scale materials for both site and house will be nearly Rs.400/- to Rs.500/- per tenement estimated to cost Rs.250/- for site and Rs.1,000/- for house. The estimated number of tenements for Nation's future requirement for industrial housing is calculated as 10 millions tenements. The factory scale material required for this purpose will thus amount to 4,000 to 5,000 millions.